Prevalence of cystic echinococcosis among cattle and sheep in the Republic of Macedonia

Jovana Stefanovska[1*], Ljubica Rashikj[1], Iskra Cvetkovikj[1],Srgjan Meshterovikj[2], Miroslav Radeski[1], Aleksandar Cvetkovikj[1], Gioia Capelli[3]

[1] Faculty of veterinary medicine, Ss. Cyril and Methodius University in Skopje, Lazar Pop-Trajkov 5-7, 1000 Skopje, Republic of Macedonia
[2] Animal health and welfare sector, Food and veterinary Agency, III Macedonian brigade 20, 1000 Skopje, Republic of Macedonia
[3] Laboratory of Parasitology, Istituto Zooprofilattico Sperimentale delle Venezie, Viale dell'Universita, 10, 35020-Legnaro (PD), Italy

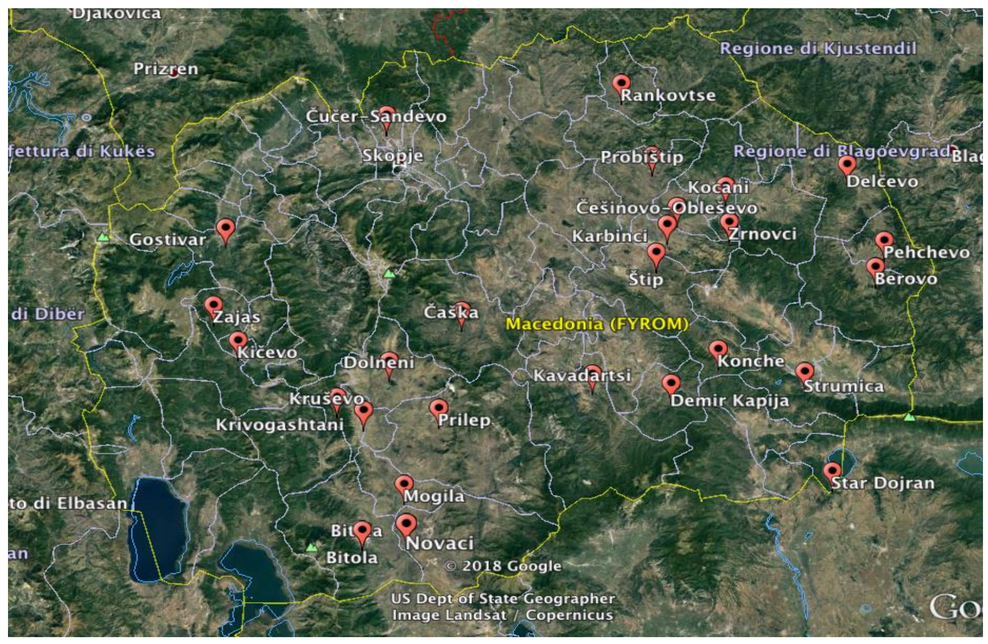
Introduction

Cystic echinococcosis (CE) is an important parasitic cyclozoonosis that inflicts enormous economic losses in the livestock sector. The disease has a worldwide distribution and is considered endemic in the Republic of Macedonia, but the real prevalence has never been determined. Therefore, the aim of this study was to estimate the prevalence of CE among slaughtered cattle and sheep during the religious feast of Kurban Bajram in 2017.

Materials and Methods

In order to estimate the prevalence of CE in cattle and sheep a total of 448 animals were controlled in six slaughterhouses, including 350 cattle from 60 farms and 98 ovine from 3 farms. Cattle sampled at the slaughterhouses originated from 67 localities/city of 28 municipalities of the country, covering the majority of the territory of Macedonia (Figure 1). Data regarding provenance, age and gender of the animal were recorded, as well as the number of cysts and their localization in organs.

Figure 1 – Location (municipalities/cities) of sampled cattle and sheep



Results

Overall, 176 animals (50.3%) showed at least one cyst. The CE in cattle is spread all over the country with no significant difference in prevalence. As expected the prevalence of CE is increasing according to age, with a minimum prevalence of 40% in animals below 3 years and a maximum of 67% in animals in the range 5-9 years (Table 1). The majority of the cysts in cattle was located in the lungs (86.4%) and the liver (65.3%), followed by the spleen (5.7%) and a single record in the kidneys. Half of the positive cattle (51.7%) harboured cysts both in the lungs and liver (Table 2). For 73 cattle the fertility of the cysts was also recorded. The majority of the animals (59/73; 80.8%) had sterile cysts and only 19% of infected animals showed fertile cysts.

Table 2 – Localization and number of Echinococcus cysts in 176 positive cattle

organ	No. cysts	Frequency	%
lungs	1 cyst	21	13.8
	> 1 cyst	131	86.2
	Total	**152**	**86.4**
liver	1 cyst	23	20
	> 1 cyst	92	80
	Total	**115**	**65.3**
spleen	1 cyst	10	100
	> 1 cyst	0	0
	Total	**10**	**5.7**

Half of the sheep (51.02%) harboured at least one cysts (Table 3). Cysts were located mainly in the lungs (46/50; 92%) and liver (36/50; 86%); 33 sheep had cysts in both location and one in the spleen. No other organs were parasitized. Cysts were fertile in the majority of sheep (48/50; 96%) with only two sheep harbouring sterile cysts. Overall, 226 animal (50.4%) showed at least one cyst, with no difference in prevalence between cattle (176 positive; 50.3%) and sheep (50 positive; 51%). For both animals cysts were located mainly in the lungs, which remain the target organ for inspection, followed by the liver. Sheep harboured significantly more fertile cysts (96%) than cattle (19%).

Table 1 – Prevalence of CE in cattle according animal's data

		pos/tested	%	significance
Age in months	<34	34/84	40.5	X^2 =11.147 P=0.011
	34-60	31/65	47.7	
	60-105	48/72	66.7	
	>105	35/71	49.3	
Gender				
	females	137/266	51.5	X^2 =0.658 ns
	males	13/28	46.4	
Provenance				
	C	52/103	50.5	X^2 =1.115 ns
	NE	31/56	55.4	
	NW	2/4	50.0	
	SE	50/105	47.6	
	SW	13/24	54.2	

Table 3 – Origin and prevalence of CE in sheep

Localitiy/city	Municipality	pos/tested	%
Mlado Ngorichane	Staro Nagorichane	9/10	90.0
Bigla	Delchevo	17/32	51.1
Dulica	Makedonska Kamenica	24/56	42.9
	Total	**50/98**	**51.02**

Conclusion

This survey gave a clear picture of the CE in livestock of the country, with a prevalence of approximately 50% both in cattle and sheep. EC is endemic all over the country with no significant difference of prevalence in different regions. The high prevalence recorded in young animals (38.5% in cattle within 24 months) suggests a high environment contamination of infectious *Echinococcus* eggs and a consequent high exposure to the infection for animals and likely humans.

Corresponding author: Prof. Jovana Stefanovska, DVM, MSc, PhD, jstefanovska@fvm.ukim.edu.mk

13th Workshop of National Reference Laboratories for Parasites, 24-25 May 2018, EURL for parasites, Istituto Superiore di Sanità, Rome, Italy