

OBSERVATIONS REGARDING THE EPIDEMIOLOGY OF HYDATIDOSIS IN CATTLE LIVESTOCK

OBSERVAȚII PRIVIND EPIDEMIOLOGIA HIDATIDOZEI LA BOVINE

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ABSTRACT | REZUMAT

The research was carried out on 571 bovines slaughtered between 2017 and 2018 in a Brasov County slaughterhouse. The observations were made by macroscopic examination of cattle carcasses and organs and the results were analysed in relation with the county of origin and the age of animal. The research, conducted between September 2017 and April 2018, on animals coming from Brasov, Sibiu, Harghita, Covasna, Prahova, Arges, Buzau, Olt and Dolj Counties, showed that 17.69% (101/571) of the animals were infested. The lowest number of hydatides in lungs was two, and the largest was 73. The size of lung hydatid cysts was less than 2 cm in 45.9% cysts, between 2-5 cm in 32.6% cysts and over 5 cm in 21.5% cysts. The hydatid cysts found in the liver had the following representation: less than 2 cm in 40% cysts, between 2-5 cm in 33.5%, and over 5 cm in 26.5%. The normal hydatid cysts prevailed both in lungs (76.8%) and liver (63%).

Keywords: *Echinococcus granulosus*, bovines, hydatidosis, parasitoses, diagnostic

Cercetările au fost efectuate pe 571 bovine abatorizate în perioada 2017-2018, care au fost sacrificate într-un abator din județul Brașov. Observațiile s-au realizat prin examinarea macroscopică a carcaselor și organelor, iar rezultatele analizate în relație cu județul de origine și vârsta bovinelor sacrificate. Cercetările efectuate pe bovinele provenite din județele: Brașov, Sibiu, Harghita, Covasna, Prahova, Argeș, Buzău, Olt și Dolj în perioada septembrie 2017 - aprilie 2018, au dus la stabilirea unui procent de 17,69% (101/571) animale infestate. Cel mai mic număr de hidatide găsite în pulmon a fost de 2, iar cel mai mare a fost de 73. Mărimea chisturilor hidatice pulmonare a fost sub 2 cm la 45,9% de chisturi, între 2-5 cm la 32,6% din chisturi și de peste 5 cm la 21,5%. Chisturile hidatice din ficat au avut următoarea reprezentare: sub 2 cm la 40%, între 2-5 cm la 33,5% și peste 5 cm la 26,5%. Chisturile hidatice cu aspect normal au predominat atât în pulmon (76,8 %) cât și în ficat (63%).

Cuvinte cheie: *Echinococcus granulosus*, bovine, hidatidoza, parazitoze, diagnostic

Cattle breeding has a long history in the Romanian area (3) and the interest in health and infectious or parasitic diseases in dairy and beef farms has been reflected in several national studies (1-6, 8-11). The hydatid disease (hydatidosis, echinococcosis or hydatid cyst) is a zoonosis that occurs in many mammalian species, more commonly ruminants, produced by larval forms of the *Echinococcus* genus, localized in various organs, with asymptomatic evolution or with polymorphic, hepatic, chronic or severe evolutions (1,2,9).

The importance of this disease lies not only in its frequency, but also in its economic implications by reducing livestock productivity and livestock production, by degrading the animal welfare by parasitizing the organs, which may lead in some cases to fatal accidents. In humans, it is important through its numerous implications in pathology and serious socio-economic problems. The most serious cases are finalised with the

death of the host (7).

Spread across all continents, the incidence is higher in geographical regions where the level of knowledge and the health education are lower. In some regions, the infestations are higher in sheep and cattle, others in horses or pigs, varying between 1-5% to over 50% (5). The human hydatidosis, called white cancer, with extremely varied localization (liver, cord, lung, spleen), remains in the category of helminths of social interest, essentially due to the recrudescence of the casuistry and difficulties, sometimes also due to the therapeutic failures (6).

The hydatidosis is a complex disease: in addition to the direct mechanical action it exerts on the parasitized organism, the hydatid cyst also has an unfavourable influence on the whole organism through its toxic-allergic action. In the veterinary medicine, the post-mortem diagnosis is easy, but since farm animals are affected (i.e. cattle, sheep, horses, swine), measures are being implemented only in serious situations, with severe prognosis (2, 9).

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Typically, the diagnosis of hydatid disease remains a difficult and demanding task, and it requires the use of immunological examinations (especially ELISA or other new methods) and imaging examinations (especially ultrasound and computerized tomography in humans). The high incidence of hydatidosis in animals under the current cattle breeding conditions led us to follow the main epidemiological aspects of cattle receptivity in *E. granulosus* larvae infections. The importance of the disease consists not just in its frequency, but also its economic implications, by reducing livestock productivity and livestock production (1,2, 5, 9).

MATERIALS AND METHODS

The research was carried out in a Brasov County slaughterhouse, between September 2017 and April 2018. In this study 571 slaughtered cattle from nine counties were investigated: Brasov, Sibiu, Harghita, Covasna, Prahova, Arges, Buzau, Olt and Dolj Counties (Table 1).

Table 1

County distribution of cattle examined for hydatidosis between 2017 and 2018 in a Brasov county slaughterhouse

	County	No. of examined animals
1	Brasov	97
2	Sibiu	345
3	Covasna	33
4	Prahova	36
5	Arges	5
6	Harghita	5
7	Buzau	20
8	Olt	22
9	Dolj	8
	Total	571

The observations were made by macroscopic examination, taking into account the breed, age and period /season in which the animals were slaughtered. The internal organs were examined for the hydatid disease and the following data were recorded: the number of cysts, the size of cysts (<2 cm, 2-5 cm, > 5 cm) and the aspect (normal, calcified, caseified, or abscessed).

RESULTS AND DISCUSSIONS

Between September 2017 and April 2018, the prevalence of cattle hydatidosis was 17.69% (101/571) in the Brasov County slaughterhouse.

Normal and calcified calcareous cysts were observed in the lungs (Fig. 1) and the liver (Fig. 2).

An infestation of greater extensibility was found in the animals from the Brasov, Sibiu and Prahova counties, than in the cattle from Covasna and Buzau counties. Negative results were obtained in the cattle from Arges, Harghita, Dolj and Olt counties. As the number of slaughtered cows in each county was not equal, it is not possible to compare the prevalence of infested animals between the counties.

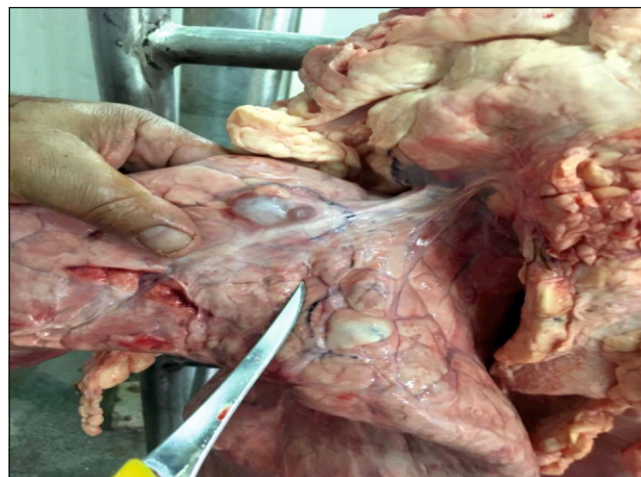


Fig. 1. Normal and calcified calcareous hydatid cyst in cattle lungs – original



Fig. 2. Hydatid cyst located deeply and at the surface of the cattle liver – original

The results of the lung hydatidosis incidence in each County, between 2017 - 2018, in a Brasov county slaughterhouse are shown in Fig. 3.

Regarding the incidence of the hydatidosis correlated to the affected organ, it was found that the pulmonary localization was 100%, all the animals had lung cysts, unlike liver cysts that were identified in only 52.5% of the cattle.

Table 2

The appearance of lung cysts and their size in cattle hydatidosis, between 2017 and 2018, in a Brasov county slaughterhouse

County	No. of cysts	Normal	Calcified	Caseified	Abscessed	Size (cm)		
						<2	2-5	>5
Sibiu	143	109	26	5	3	81	42	20
Brasov	374	284	57	21	12	159	120	95
Covasna	52	41	5	4	2	28	16	8
Prahova	157	126	21	6	4	64	59	34
Buzau	8	4	2	2	0	5	2	1
Total	734	564	111	38	21	337	239	158

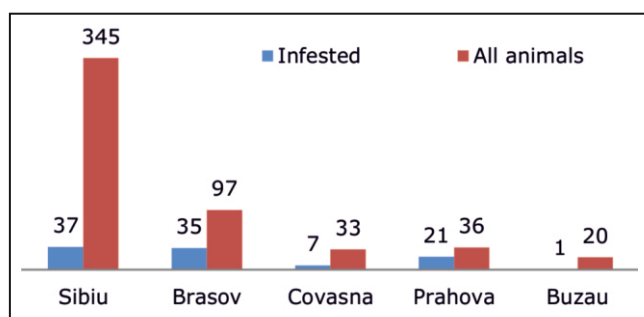


Fig. 3. Number of animals with lung cysts in counties with cattle hydatidosis between 2017 and 2018 in a Brasov county slaughterhouse

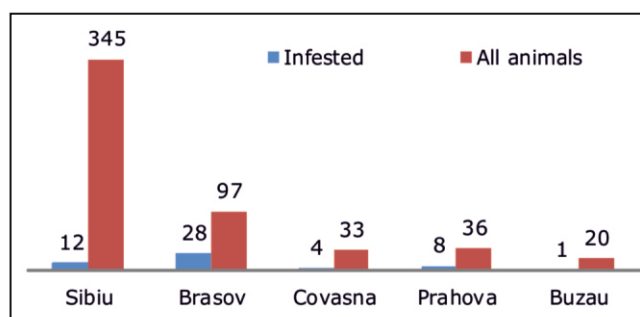


Fig. 4. Number of animals with liver cysts in counties with cattle hydatidosis between 2017 and 2018 in a Brasov county slaughterhouse

Table 3

The appearance of liver cysts and their size in cattle hydatidosis, between 2017 and 2018, in a Brasov county slaughterhouse

County	No. of cysts	Normal	Calcified	Caseified	Abscessed	Size (cm)		
						<2	<2	<2
Sibiu	62	53	6	1	2	29	22	1
Brasov	398	212	68	51	67	140	126	132
Covasna	31	22	5	2	2	8	14	9
Prahova	76	68	7	1	0	40	26	10
Buzau	6	6	0	0	0	2	4	0
Total	573	361	86	55	71	229	192	152

The results of the cysts appearance of and their size in lung hydatidosis are shown in Table 2.

The results of the liver hydatidosis incidence in each County, between 2017 and 2018, in a Brasov county slaughterhouse are shown in Fig. 4.

Regarding the variation of cattle infestation, it is observed that many factors coexist in the presence and diffusion of this metacestodosis. The results were statistically processed for a greater objectivity in interpretation.

The results of the cysts appearance of and their size in liver hydatidosis are shown in Table 3.

Regarding the incidence of hydatidosis according to the age of the bovines, as the youngest infected slaughtered animal, we identified a male from Sibiu County, 19 months old, and, at the opposite side, there was a 155-month-old female from Brasov County. In this study, a low incidence was observed in young animals with a tendency of exponential growth in the elderly.

In several countries, cystic echinococcosis has been successfully controlled or eradicated (12), but in Romania, considering the results described in this study, hydatidosis / echinococcosis still has a significant prevalence in animals and it remains a serious threat to human health.

CONCLUSIONS

The average incidence of hydatidosis, recorded in the slaughtered herd (n=571), in the analysed period, was of 17.68%. The pulmonary localization of cysts was found in all the 101 infested animals, while liver localization was recorded in 52.5% (53/101).

The smallest number of hydatides found in lungs was of 2, and the largest number of cysts identified in a bovine lung was of 73. The size of lung cysts was in 45.9% less than 2 cm, in 32.6% between 2-5 cm and in 21.5% over 5 cm. The size of liver cysts was in 40% less than 2 cm, in 33.5% between 2-5 cm and in 26.5% over 5 cm.

In the lungs, 76.8% of the hydatid cysts were normal, 15.1% calcified, 5.2% caseinated, and 2.9% abscessed. In liver, 63% of the hydatid cysts were normal, 15% calcified, 9.6% caseinated, and 12.4% abscessed.

REFERENCES

1. Coman A., (2018), Epidemiological and anatomopathological study in cattle hydatidosis in Brasov County [in Romanian], Bachelor's degree, Faculty of Veterinary Medicine, Bucharest, Romania
2. Coman I., (2006), Hydatidosis in animals [in Romanian], (Ed.) Risoprint, Cluj-Napoca, Romania, 28-42
3. Constantinescu D.M., (2015), Past and present in the cattle breeding in Romania. *Revista Romana de Medicina Veterinara*, 25(2):61-64
4. Danes D., Baraitareanu S., (2015), Lyme borreliosis options of diagnostic by polymerase chain reaction in livestock. *Journal of Biotechnology*, 208 (Supplement):S87-S87
5. Dulceanu N., Terinte C., Mitrea I.L., Polcovanica C., (2000), *Encyclopedic Dictionary of Parasitology* [in Romanian], (Ed.) Academia Romana, Bucharest, Romania
6. Gherman I., (2000), Drug treatment of hydatid disease. *Romanian Contributions* [in Romanian]. *Revista Romana de Parazitologie*, 10(1):18-20
7. Jenkins D.J., Roming T., Thompson R.C., (2005), Emergence / re-emergence of *Echinococcus* spp. – a global update. *Int J Parasitol*, 35(11-12):1205-1219
8. Manescu M.A., Baraitareanu S., Gurau G.R. Danes D., (2016), Schmallenberg-Simbu group viruses' circulation in Romanian's livestock from South-West Oltenia Region. *Journal of Biotechnology*, 231 (Supplement):S88-S88
9. Mitrea I.L., (2002), Parasitic diseases in animals [in Romanian], (Ed.) Ceres, Bucharest, Romania
10. Saraz I., Groza I., Cenariu M., Ciupe S., Pop R., (2018), Study regarding seasonal incidence of fluoroquinolones in cow raw milk and their relationship with somatic cells count. *Revista Romana de Medicina Veterinara*, 28(1):37-40
11. Stefan G., Zorlescu A.M., Baraitareanu S., Danes M., Gurau M.R., Danes D., (2018), A decade of *Listeria monocytogenes* monitoring in milk and dairy products in Romania. *Journal of Biotechnology*, 280 (Supplement):S53-S53
12. Torgerson P.R., Budke C.M., (2003), Echinococcosis – an international public health challenge. *Res Vet Sci*, 74(3):191-202.