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PREVALENCE OF *CRYPTOSPORIDIUM* SP. IN FARM ANIMALS IN WESTERN POMERANIA

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ABSTRACT

Studies on cryptosporidiosis were carried out on 171 calves from 5 selected farms in the region of Western Pomerania , 37 lambs from 2 farms and 26 colts, respectively, between March 1999 and June 2001. The detection of *Cryptosporidium* sp. based on the two methods, ie. the Ziehl–Neelsen staining technique and the coproantigen test. The positive effects having applied the coproantigen test were recorded in 24.56% calves, 24.32% lambs, and 11.54% colts.

Key words: *Cryptosporidium* sp., calves, lambs, colts

INTRODUCTION

The *Cryptosporidium* sp. infection was recorded in over 170 animal species in 50 countries [15]. The *Cryptosporidium* sp. has long been known in the veterinary medicine as the factor causing intestine diseases (in calves, lambs, goatlings and colts) and also respiratory tract diseases (in turkeys, chicken and pheasants). Up to the present time 8 species of *Cryptosporidium sp*. have been discovered , ie. *C. felis, C. wrairi, C. parvum, C. muris, C. meleagridis, C. baileyi, C. serpentis, and C. nasorum*. The *Cryptosporidium* species belong to the Apicomplexa type which cause the diseased called cryptosporidiosis in humans and several animal species [6, 7]. The humans get infected with this parasite by means of the contaminated environment. The main source of the plague are the adult animals which are asymptomatic carriers of the oocyst, the fodder contaminated with the dung of mice and rats, the fodder containers, the boxes, the dirty clothes of the staff and the tools [1].
The oocysts of *Cryptosporidium* sp. can survive for a long time in the surface water [18]. Several epidemics of cryptosporidiosis deriving from water in humans were recorded in the USA [8]. The humans can get infected

having contact with animals [7]. The symptomatic cryptosporidiosis in humans with the immunological deficiency causes chronic emaciating diarrhoeas, which are the direct cause of death in 3–15% AIDS patients.

The *Cryptosporidium* was first described by Tyzzer, who recorded *C. muris* in the stomach of mouse in 1907 (Tyzzer 1907). Whereas, the *Cryptosporidium* sp. in the cattle in the USA was first described by Panciera *et al*. [17]. Since 1980 the interest in the infections induced by *Cryptosporidium* sp. has grown world over.

In the majority of cases the cryptosporidiosis is diagnosed due to the presence of the oocysts and/or antigens in the feces. Over 20 methods of staining aiming at the oocysts identification are applied in the microscopic diagnostics of cryptosporidiosis [22]. However the microscopic methods frequently fail in the diagnosis of the asymptomatic infections, which are slightly intensive (50 000 oocysts in 1 g feces constitute the detectable limit) [21].

There are scarce data on the prevalence of *Cryptosporidium* sp. in farm animals in West Pomerania.

The aim of this work was to examine the epizootic invasion of *Cryptosporidium* sp. in farm animals (calves, lambs, and colts) in Western Pomerania.

MATERIALS AND METHODS

The research was conducted in Western Pomerania between March 1999 and June 2001. It comprised 171 calves of the holstein breed with 50% hf content from 5 large–stock farms. The calves under examination were 4 to 27 days–old. Some of them were diagnosed with diarrhoea. The research comprised also 2–14 days–old 37 lambs from two large–stock farms and 26 colts of 2–10 weeks of age.

The examination of the feces samples to detect *Cryptosporidium* was worked out with the modified technique of Ziehl–Neelsen staining method (Anonymous 1991), as well as a commercial immunoenzymatic microtest (ProSpecT® Cryptosporidium Microplate Assay, Alexon Inc.). The immunoenzymatic test was applied according to the producer's instruction.

RESULTS AND DISCUSSION

The coproscopic examinations proved that the calves of both sexes were infected with *Cryptosporidium* sp. at 24.56% (Table 2). Majewska *et al*. [12] found the oocysts of *Cryptosporidium* sp. in Wielkopolska in 34.4% cattle (39.7% calves, 6.6% cows). Kozakiewicz *et al.* [10] recorded in their research conducted in 5 regions of Wielkopolska an extensive infection of calves with *Cryptosporidium* sp. at 38.7%. Another examination conducted by the same authors also in Wielkopolska proved the extensiveness of infection at 56.25% [11]. The extensiveness of *Cryptosporidium* sp. invasion in calves in other countries ammounts to: Sweden 13% [9], Canada 20.0% [16], Czechoslovakia 41.0% [19], Spain 19.7% [18].

The prevalence of *Cryptosporidium* sp.was mainly dependent on the age of the calves (Table 2). The oocysts of *Cryptosporidium* sp. were found in the 4–19 days–old calves . The most infected with the *Cryptosporidium* sp. invasion were the calves between the 8th and 11th day of life (Table 2). Similar results were obtained by Sterba and Sulcova [19] and Kozakiewicz and Maszewska [10].

Table 1. Prevalence of *Cryptosporidium* sp. in calves

Farm	Number of examined samples	Positive results of examination	
		Ziehl–Neelsen'a method	mikrotest imunoenzymatyczny (koproantygen)
A	66	19	21
B	26	8	9
C	25	3	3
D	36	9	9
E	18	0	0

Table 2. Prevalence of *Cryptosporidium* sp. depend on calves age

Age of calves [days]	Number of examined samples	Number of specimens infected *Cryptosporidium* sp.	Infection rate [%]
I (4–8)	27	6	22.22
II (8–11)	40	24	60.00
III (11–15)	22	9	40.90
IV (15–19)	28	3	10.71
V (19–23)	28	0	0
VI (23–27)	26	0	0
Total	171	42	24.56

Relatively high intensivened of *Cryptosporidium* sp. invasion was recorded in 17 calves with the diarrhoea symptoms (yellowss–green watery consistency of feces with blood). Those calves were from B and A farms. The *Cryptosporidium* sp. oocysts were also found in calves devoid of any diarrhoea symptoms, which is determined by the age of calves and the intensiveness of invasion (Table 2). No oocysts of *Cryptosporidium* sp. were found in calves from E farm (Table 1). The extensivenees of *Cryptosporidium* sp. infection amounted to: 31.81% in A, 34.62% in B, 12% in C, 25% in D (Table 1). No statistically significant differences between the prevalence of *Cryptosporidium sp* in calves and their sex were observed (Table 3). This fact is also noted by other authors Aurich *et al.* [2].

Table 3. Prevalence of *Cryptosporidium* sp. in calves conditioned by sex

	♂	♀
Number of specimens examined infected	87	84
With *Cryptosporidium* sp.	22	20
E. I. [%]	25.29	23.81

Mlynarczyk *et al.* [14] stated that early feeding of the calves with the beestings of standard value rich in immunoglobulins is one of the factors preventing the infection with *Cryptosporidium* and effects negatively the intensiveness of invasion.

The cases of the prevalence of *Cryptosporidium* sp. in horses were recorded in various regions of the world and always accompanied diarrhoea and the incidence in colts, however these informations are contradictory while certain aspects of the infection still remain obscure [5, 23].

The coproscopic examinations showed that the colts in Western Pomerania were infected with *Cryptosporidium* sp. at 11.54%. This extensiveness was higher as compared to that in Germany and certain regions in the USA (Texas and Colorado), where it ranged between 0.033–3.0% [3, 4], however lower as compared to Canadian authors and other ones from the USA (Louisiana, Colorado, and Texas), where it ranged between 0.33–3.0% [3, 4], however lower as compared to Canadian authors and other ones from the USA (Louisiana, Colorado, and Texas), where it ranged between 17–100% [5,16]. Majewska *et al.* [13] stated in their research conducted in Wielkopolska the extensiveness of *Cryptosporidium* sp. infection in horses amounting to 9.4%.

Majewska *et al.* [12] recorded *Cryptosporidium* sp. oocysts in 8.8% sheep (6.7% lambs and 9.8% adults) in Wielkopolska. Present research proves the infection in lambs with *Cryptosporidium* sp. at 24.32% (Table 4). The prevalence of *Cryptosporidium* sp. was mainly determined by the age of lambs (Table 4). The *Cryptosporidium* sp. oocysts were found in 4–12 days–old lambs. The most infected by the invasion of *Cryptosporidium* sp. were 8–10 days–old lambs (Table 5). According to various authors [16, 20, 23] the extensiveness of the invasion of *Cryptosporidium* sp. in lambs ranges from 23 to 100%. The differences result mainly from the geographical location and the zoohygienic conditions in the respective farms.

Table 4. Prevalence of *Cryptosporidium sp.* in lambs and colts

Animal species	Number of examined samples	Positive results of examination	
		Ziehl–Neelsen'a methoda	mikrotest imunoenzymatyczny (koproantygen)
Lambs	37	6	9
Colts	26	1	3

Table 5. Prevalence of *Cryptosporidium* sp. in lambs conditioned by age

Age of lambs [days]	Number of specimens	Infected with *Cryptosporidium* sp.	Infection rate [%]
I (2–4)	6	0	0
II (4–6)	5	2	40.00
III (6–8)	7	3	42.86
IV (8–10)	6	3	50.00
V (10–12)	6	1	16.67
VI (12–14)	7	0	0
Total	37	9	24.32

There is no potent antidote against cryptosporidiosis at present. The only way to fight against it is the annihilation of oocysts in the environment by means of: keeping the calves in the individual boxes during the first two weeks of life, isolating sick animals, aiming at the elimination of *Cryptosporidium* sp. from the environment, feeding the new–born animals with beestings immediately after birth.

CONCLUSIONS

Summing up it can be stated that the prevalence of *Cryptosporidium* sp. in farm animals of Western Pomerania can constitute a significant menace for the humans as well as a serious epizootiological problem.

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