

## PREVALENCE OF CRYPTOSPORIDIOSIS IN BUFFALOES IN AND AROUND BHUBANESWAR, ODISHA

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### ABSTRACT

Faecal samples collected from 305 buffaloes (89 diarrheic and 216 non diarrheic) of different age and sex from Bhubaneswar and adjacent areas of Cuttack and Puri district were examined during a period of three years. Cryptosporidial oocysts were detected in 76 (24.92%) faecal samples. Prevalence of cryptosporidiosis was higher in diarrheic than non diarrheic buffaloes. Significant variation was observed in prevalence between diarrheic and non-diarrheic buffaloes ( $P < 0.05$ ). Highest prevalence was observed in the calves aged below one month followed by calves aged 1 - 3 months of age, 3 months to 1 year and lowest prevalence was observed in the buffaloes aged more than 1 year. Cryptosporidiosis was found to be more prevalent among male than in female buffaloes. Highest percentage of prevalence was recorded in summer season (March-June) followed by Rainy (July-October) and lowest in Winter (November-February).

**KEY WORDS:**Prevalence, Cryptosporidiosis, Buffaloes

### INTRODUCTION

Cryptosporidiosis is a disease that affects amphibians, birds, mammals, fish and reptiles due to infection of the microvillus border of the epithelial surface of gastrointestinal tract by the protozoan parasite *Cryptosporidium* Spp. (Fayer, 2008). This parasite of humans and animals has a worldwide distribution (Mead, 2002). Severity and duration of infection vary with the species of *Cryptosporidium* and the immune status of the infected subjects (Fayer, 2004). Cryptosporidiosis causes significant morbidity among bovine calves manifested by acute watery or steatorrheic diarrhea and colic resulting in weight loss and delayed growth which leads to huge economic loss (Chen et al., 2002). With the attainment of immunological maturity infection subsides in older animals, but they remain as carriers and act as source of infection to the susceptible individuals (Bhat et al., 2012).

Cryptosporidiosis in buffaloes has been reported in many countries (Sabry et al., 2008, Galiero et al., 1994; Rinaldi et al., 2007; Villanueva et al., 2010 and Heidarnegadi et al., 2012) as well as in India (Dubey et al., 1992 and Jeyabal and Ray, 2005, Chattopadhyaya et al., 2000) (Bhat et al., 2012) with variable percentage of prevalence.

The present study was undertaken to investigate the prevalence of cryptosporidiosis in buffaloes in relation to age, sex and season in and around Bhubaneswar, Odisha.

### MATERIALS AND METHODS:

During a period of three years (March 2009 to February 2012) faecal samples of 305 buffaloes were examined for cryptosporidiosis. Samples were collected from the small dairy buffalo herds established in and around Bhubaneswar city and adjacent areas of Cuttack and Puri District. Faecal samples (approximately 10 gm.) were collected directly from the rectum using sterile disposable hand gloves in case of buffalo calves, and from the middle portion of the freshly voided faecal mass in case of adult buffaloes. While collecting the faecal samples the breed, gender, age, general body condition, faecal consistency, source of drinking water and place of wallowing were recorded.

At least three direct faecal smears were prepared on clean grease free microscope slides for each sample. The faecal smears were stained by modified ZiehlNeelsen (mZN) staining procedure (OIE,2008). The stained smears were examined under oil immersion lens of a bright field microscope to detect red stained *Cryptosporidium* oocysts against a green background.

Faecal samples which revealed no oocyst on all three direct smears were subjected to formal-ether centrifugal sedimentation technique to concentrate the faecal oocysts from 1 gm. of faeces (OIE, 2008). Smears were prepared on clean microscope slides exhausting entire sediment, air-dried and stained with mZN stain and each smear was thoroughly scanned under oil immersion objective for *Cryptosporidium* oocysts. Absence of red stained oocyst in the concentrated faecal material was considered as negative for cryptosporidiosis.

Chi square test of independence of attributes was carried out to test the association of age, gender,diarrheic/non-diarrheic groups and season as per Snedecor and Cochran (1994).

### RESULTS AND DISCUSSION:

Out of 305 buffaloes (89 diarrheic and 216 non diarrheic) examined, 76 buffaloes (24.92%) were found positive for *Cryptosporidium* oocysts (Table-1). Prevalence of cryptosporidiosis was higher in diarrheic than non-diarrheic buffaloes and the variation was found to be significant ( $P<0.05$ ).Rinaldi et al.(2007) recorded 24.4% of prevalence of bubaline cryptosporidiosis in central Italy which was almost similar to our present finding. Higher rate of prevalence of cryptosporidiosis in diarrheic buffaloes has been reported earlier by Chattopadhyay et al.,(2000); Bhat et al.,(2012), and Galiero et al.(1994); El-Rahim et al.(1997), El.Sherif et al.(2000) and Sabry et al. (2008).

Present observations on age wise prevalence of cryptosporidiosis in buffaloes (Table-1) revealed that highest prevalence was observed in the calves aged less than 1 month followed by calves 1-3 months of age, 3 months to 1 year and lowest prevalence was observed in the buffaloes aged more than 1 year. Chattopadhyaya et al. (2000),El.Sherif et al.(2000) and Bhat et al. (2012) have also reported highest percentage of prevalence of cryptosporidiosis in buffalo calves aged below one month. The rate of prevalence of cryptosporidiosis among buffaloes went on decreasing with the increase in age which might be due to gradual development of immunity with advancement of age.

Analysis of data on gender wise prevalence of cryptosporidiosis among 92 male and 213 female buffaloes under present study indicated that males had higher rate of prevalence (28.26%) than females (23.47%) which was in agreement with the earlier report made by Chattopadhyaya et al.(2000). Bhat et al. (2012) had recorded more prevalence of cryptosporidiosis in female buffaloes than male, while Sabry et al. (2008) could see no effect of gender on cryptosporidiosis in buffaloes.

During present investigation highest percentage of infection was recorded in summer season followed by Rainy and lowest in Winter (Table-2). However, *Cryptosporidial* oocysts were detected throughout the year in both diarrheic and non-diarrheic buffalo faeces. The prevalence rate was significantly higher ( $p<0.01$ ) in summer season in comparison to Winter season. El.Sherif et al.,(2000) and Sabry et al.,(2008) recorded highest percentage of prevalence of buffalo cryptosporidiosis during winter and lowest in Summer while Bhat et al. (2012) reported highest percentage of prevalence during monsoon followed by pre-monsoon and lowest in post monsoon. The highest rate of prevalence of cryptosporidiosis in buffaloes in summer observed during the present investigation could be explained by the fact that buffaloes in these areas of costal Odisha where the summer is humid and hot remain under severe stress,and frequently visit the village ponds and creeks for wallowing and drinking water. Due to summer those ponds and creeks usually contain very less amount of muddy water heavily contaminated with human and animal excreta as a result of which buffaloes get exposed to many enteric pathogens including highly resistant infective *Cryptosporidium* spp. oocysts.

**Table - 1** Prevalence of cryptosporidiosis among diarrheic and non-diarrheic buffaloes in relation to age.

| Age Group      | Diarrheic   |                   |              | Non-Diarrheic |                   |              | Total       |                   |              |
|----------------|-------------|-------------------|--------------|---------------|-------------------|--------------|-------------|-------------------|--------------|
|                | No examined | No found positive | %            | No examined   | No found positive | %            | No examined | No found positive | %            |
| 1 month        | 15          | 8                 | 53.33        | 39            | 11                | 28.21        | 54          | 19                | 35.19        |
| 1-3 months     | 18          | 7                 | 38.89        | 21            | 5                 | 23.81        | 39          | 12                | 30.77        |
| months - 1year | 24          | 7                 | 29.17        | 71            | 14                | 19.72        | 95          | 21                | 22.11        |
| > 1 year       | 32          | 5                 | 15.63        | 85            | 19                | 22.35        | 117         | 24                | 20.51        |
| <b>TOTAL</b>   | <b>89</b>   | <b>27</b>         | <b>30.34</b> | <b>216</b>    | <b>49</b>         | <b>22.69</b> | <b>305</b>  | <b>76</b>         | <b>24.92</b> |

Variation in rate of prevalence among diarrheic and non-diarrheic buffaloes is significant ( $P < 0.05$ )

Variation in rate of prevalence among buffalo below one month age and above one year age is significant ( $P < 0.05$ )

**Table- 2** Season wise prevalence of cryptosporidiosis in buffaloes

| SEASON                | No of samples |           | %            | Significance                                |
|-----------------------|---------------|-----------|--------------|---|
|                       | Examined      | Positive  |              |   |
| Summer (Mar-June)     | 121           | 47        | 38.84        | Summer vs Winter significant ( $P < 0.01$ ) |
| Rainy (July-October)  | 82            | 18        | 21.95        |   |
| Winter (Nov-February) | 102           | 11        | 10.78        |   |
| <b>TOTAL</b>          | <b>305</b>    | <b>76</b> | <b>24.92</b> |   |

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