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# Studies on the prevalence of zoonotic important protozoan parasite *Sarcocystis* sp. in Nepal

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**Abstract**

Sarcocystosis is a disease caused by *Sarcocystis* sp. of protozoan parasite and it has a zoonotic aspect. Four hundred forty one water buffaloes (*Bubalus bubalis*) were examined to assess zoonotic important protozoan and helminth parasites. Among them 441 buffalo samples were observed, only 285 (64.63%) buffaloes were infected with protozoan and helminth parasites. The total prevalence rate of protozoan parasite *Sarcocystis* sp. was the highest 124 (43.51%). The prevalence rate of five different areas of the country, the highest prevalence rate was found in Butwal 37 (49.46%) followed by Dharan 26 (48.14%), Kathmandu 22 (46.80%), Chitwan 38 (41.30%) and Nepalganj 18 (32.72%). So, in Nepal *Sarcocystis* sp. was most common parasite of water buffaloes and most of the human infection occurs by ingestion of raw or improperly cocked meat of infected animals. The risk of infection of *Sarcocystis* sp. was very high but not yet paid attention neither from the Government nor from the private sectors.

**Keywords**- Parasite, Prevalance, Protozoa, Sarcocystosis, Zoonotic,

## Introduction

*Sarcocystis* sp. an apicomplexan protozoan there are numerous species of *Sarcocystis* in domestic animals. Once they are regarded as a non -pathogenic parasite but new investigation showed that they are pathogenic and has been found associated with disease conditions in both animals and man. The economic loss has been estimated to be in terms of millions of dollars to the cattle industry due to the condemnation or downgrading of meat containing grossly visible *sarcocystis*. However, economic losses from clinical and subclinical infections are difficult to calculate because it is difficult to differentiate affected and non-affected animals (Fayer and Dubey, 1986). In Nepal *Sarcocystis* sp. very common especially in buffaloes, they are generally found in the mucosa of oesophagus, but also found in the other part of the body such as stomach, tongue etc. *Sarcocystis hominis* and *S. suihominis* are the common species which reported in human. The risk of sarcocystosis is higher in Nepal due to lack of public health awareness and not implementation of slaughter house policy by the Government. All of these species of *Sarcocystis* have either the dog or the cat as a definitive host and herbivore as the intermediate host. Some cases human may acts as definitive host and play vital role in public health aspects.

## Materials and methods

Four hundred forty one buffalo samples were collected from abattoirs of five different areas from January 2013 to Dec., 2015. Samples were minutely observed and collected for zoonotic important parasites. During research work blood, oesophagus, intestine, liver, lungs, kidney, gall bladder, bile duct, peritoneal cavity, were thoroughly observed for zoonotic important protozoan parasites.

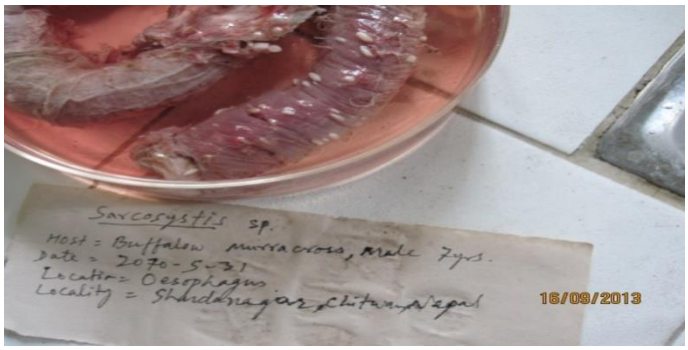


Fig.1. Cyst of the *Sarcocystis sp.* in the sub mucosal wall of the oesophagus of buffalo

All the collected larger parasites or cyst were preserved in PBS (Phosphate Buffer Solution pH7.2) or 90% ethanol, blood were collected in EDTA containing tubes and organs which contain parasite/ cyst/ larva were kept in ice pack and carried into parasitological laboratory for detection of parasite/cyst and stored at -20$^0$C deep refrigerator for further processes.

**Detection, fixation and preservation**- Larger parasites are directly collected from different organs but smaller parasites were detected with the help of dissecting microscope or hand lens cyst of *Sarcocystis* sp. of protozoa (Fig. 1.) is directly kept in PBS and stored in deep refrigerator (-20$^0$C).

**Result and Discussion**

A total of four hundred forty one water buffaloes (*Bubalus bubalis*) were examined for zoonotic important protozoan and helminth parasites. Among them 441 buffalo samples observed, only 285 (64.63%) buffaloes were infected with protozoan and helminth parasites. The total prevalence rate of protozoan parasite *Sarcocystis* sp. was the highest 124 (43.51%). The prevalence rate of five different areas of the country, the highest prevalence rate was found in Butwal 37 (49.46%) followed by Dharan 26 (48.14%), Kathmandu 22 (46.80%), Chitwan 38 (41.30%) and Nepalganj 18 (32.72%). So, in Nepal *Sarcocystis* sp. was most common parasite of water buffaloes and most of the human infection occurs by ingestion of raw or improperly cocked meat of infected animals. Khaled et al., (2011) had reported with an overall prevalence rate of *Sarcocystis* spp. of buffaloes in Egypt were 78.9% while in Nepal the overall prevalence rate were found to be 44.23%. According to Dubey et al., (2014) in cattle three species were recognized with known endogenous stages, viz.: *S. cruzi* (with canine definitive host), *S. hirsuta* (feline definitive host), and *S. hominis* (primate definitive host). Recently, a fourth *Sarcocystis* species with an unknown life cycle had been reported from cattle. In the water buffalo, four species of *Sarcocystis* had been described: *S. fusiformis* (feline definitive host), *S. buffalonis* (feline definitive host), *S. levinei* (canine definitive host), and *S. dubeyi* (definitive host unknown but not cat or dog). Besides, there are studies of *Sarcocystis* infections in buffalo and cattle from China with results that are difficult to interpret and validate. For example, some of the studies report transmission of *Sarcocystis* species between cattle and buffalo, but steps to preclude exogenous exposures was not reported. A species of the water buffalo, *'S. sinensis'*, was proposed at a Chinese national conference in 1990, and published as an abstract without figures and with no archived type specimens for verification. The International Code of Zoological Nomenclature Articles 9 and 10 state that "abstracts of articles, papers, posters, text of lectures, and similar material when issued primarily to participants at meetings, symposia, colloquia or congress does not constitute published work"; therefore, *S. sinensis* is a nomen nudum.

According to Fayer (2004) the most common species of *Sarcocystis* which infects human were *S. hominis* and *S. suihominis.* Prakas et al., (2012) has currently reported that more than 220 *Sarcocystis* species were found. Sarcocystosis is now recognized as an emerging protozoan disease in animals (Srivastava et al., 1977) and man (Juyal and Bhatia, 1989; Shah, 1995) and it has generated interest among veterinary protozoologists all over the world. *Sarcocystis hominis* although regarded as non-pathogenic to cattle as the intermediate host, it causes intestinal and muscular Sarcocystosis in man as the definitive host. and is zoonotic in nature. Humans was one of natural host of *Sarcocystis* species and may serve as both intermediate and definitive hosts. However, the extent and public health significance of human *Sarcocystis* infection are incompletely known. Of two zoonotic species viz., *S. hominis* and *S. suihominis* with cattle- man and pig-man cycles, only of some significance in India due to backyard pig rearing and slaughter practices (Chhabra and Samantaray, 2013). The risk of infection of *Sarcocystis* sp. is very high but not yet paid attention neither from the Government nor from the private sectors.

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