Prevalence of Cryptosporidium, Giardia and Other Gastrointestinal Parasites in Dairy Calves in Mandalay, Myanmar

K. K. Lay1, h.c.F. Hoerchner2, N. Morakote3, K. Kreausukon4*
1Animal Husbandry, University of Veterinary Science, Yezin, Nay Pyi Taw, Myanmar
2Parasitology, Freie University Berlin, Berlin, Germany
3Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand
4Veterinary Public Health Centre for Asia Pacific, Chiang Mai University, Chiang Mai, Thailand
*Corresponding author

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Introduction
Calf mortality in rural areas of undeveloped countries is often very high and the causes of morbidity and mortality in may cases are mainly due to infections of gastrointestinal parasites. *Cryptosporidium, Giardia* and other gastrointestional parasites are widely spread among cattle in Myanmar. The infection with *C. parvum* and *G. intestinalis* is often overlooked and underestimated but these protozoan parasites possess high zoonotic significance (1). *Cryptosporidium* has been initially reported in a mouse in 1912 by Tyzzer, but its impact on animal health has not been recognized until the early 1970, when association with diarrhea in calves mainly in the first 30 days of age has been observed (2). *G. duodenalis* hosted in different mammals is the only species found in humans (3). *G. intestinalis* infected dairy calves as young as 4 days of age but the main prevalence occurs at 5-10 weeks of age with the highest cysts excretion in feces at 1-6 weeks of age (4). Infected calves may exhibit chronic pasty diarrhea, weight loss, lethargy and poor condition (5). The infection can persist for several months and results in numerous episodes of diarrhea (4). Helminthes such as ascarids, gastrointestinal strongyles (GIS) as well as coccidia are responsible for long lasting diarrhoea with high morbidity and mortality rate (6). Bovine coccidiosis occurs in all parts of the world and serious outbreaks may occur in dairy herds where young stocks are kept in large numbers (7). However the information on the prevalence and incidences of these parasites are lacking in Myanmar context. This study was intended to estimate the prevalence and incidence rate of *Cryptosporidium, Giardia*, strongyles, coccidia and ascarids in calf of 1 week to 17 weeks of age. It also determines the age specific variation in occurrence of gastrointestinal parasites in calves.

Materials and Methods
This study was a cross-sectional and longitudinal study on the status of gastrointestinal parasites of dairy calves conducted in six areas (Pyigyitagon, Patheingyi, Amarapura, Kyauske, Sintkine and Tataroo) of Mandalay Division, Myanmar. The stratified random sampling method was used to select calves from six different areas in the period between Nov. 2006 and Apr. 2007. Farms in each area were categorized into large (≥5 cattle) and small farms (<5 cattle). Samples were collected from 79 calves of large farms and from 141 calves of small farms. Large farms located in Patheingyi and Kyauske region while small farm in Pyigyitagon, Amarapura, Sintkine and Tataroo region. The selected animals in each farm were identified by record number and owner recognition. In first, 50 calves each of 1 week and 5 weeks of age were selected. Likewise from 40 calves each of 9, 13 and 17 weeks old animals have been used. From all these calves feces samples were performed in 4 weeks intervals, so that in total 690 fecal samples were collected following the diagram:

| Calf age in wks | No of samples collected over the weeks |
|----------------|--|---|---|---|---|---|---|
| 1              | 1 5 9 13 17 Total |
| 5              | 50 50 50 50 50 250 |
| 9              | 50 50 50 50 50 200 |
| 13             | 40 40 40 40 120 |
| 17             | 40 40 40  |
| Total          | 50 100 140 180 220 690 |

The direct identification of *Cryptosporidium* infection in calf was done through staining with the modified Ziehl-Nelsen acid fast stain (8) and indirect identification was done using the copro-antigen ELISA (Bio-X diagnostics, Germany). The direct identification of *Giardia* infection was by using the modified double centrifugation technique (9) and the diagnosis of helmintch and coccidian infections with the Floatation method by using the saturated sodium chloride solution (10). The egg excretion was calculated as +1: few eggs/oocysts /cysts in the total sample field, +2: few eggs/oocysts /cysts within one ocular field and +3: many eggs/oocysts /cysts in an ocular field.

Results and Discussion
Concerning the total of 690 feces samples of 220 calves, the prevalence of *Cryptosporidium* was highest with 57.3% followed through *Eimeria spp*. 52.3%, *Giardia* 34.1%, *Strongyloides papillosus* 7.4%, gastrointestinal strongyles (GIS) 5.2% and *Toxocara vitulorum* 2.3%. (Fig. 1) *T. vitulorum* 13% and *S. papillosus* 15% is highest in 5 weeks calves and GIS 10.6% in 13 weeks calves (Fig. 2).
Cryptosporidium 82% and Giardia 50% prevalence is highest in 1 week calves and Eimeria 61.8% in 17 weeks calves. The excretion of oocysts/cysts from Cryptosporidium and Giardia was quite low. Many cases had high excretion rates of oocysts with diarrhea. For Cryptosporidium through copro-antigen ELISA only 2% of 179 samples were positive (OD=0.15).

Fig. 1 Prevalence of T. vitulorum, S. papillosus and GIS in 1 wk to 17 wks old calves

Fig. 2 Prevalence of Eimeria, Cryptosporidium and Giardia in 1 wk to 17 wks old calves

Table 2. showed that the incidence rate of infection of Cryptosporidium has increased with aging of calves contrast to S. papillosus. The trend of incidences was different in Giardia, Eimeria, T. vitulorum and GIS infection. An incidence of Cryptosporidium 56.4% and Eimeria 58.7% was highest at 17 week age calf while an incidence of T. vitulorum and S. papillosus was highest at 5 week age where as Giardia and GIS at 13 week age.

Concerning the parasitic occurrence based on farm status, the overall prevalence of T. vitulorum and Cryptosporidium was lower in smaller farms (1.19% and 56.69% respectively). The occurrence of S. papillosus (8.13%), GIS (5.98%), Eimeria (54.06%) and Giardia (35.16%) was high in small farms. The results of this study showed that shedding of Cryptosporidium oocysts were found in all age group categories but with a high prevalence 82% in 1 week old calves. Considering the prevalence of cryptosporidiosis mentioned in the literature data concerning the amount of excreted oocyst materials are more seldom. Therefore, findings on the prevalence in our study are in agreement with those of previous studies but the oocyst out put was very low. Our results on the prevalence of Giardia were in congruence with previous reports In this study it revealed that prevalence of Giardia infection in 1 week to 17 weeks old calves varying between 50% and 26.8% respectively. This is similar to the report of Xiao and Herd (1994), show a range of prevalence of 34.5-65.5% in 2-10 weeks of calves. A prevalence of Eimeria spp. except in the first week ranged between 46%, and 61.82% respectively in different age group. Moreover, an overall prevalence was 52.3%. A prevalence of Eimeria increased from zero shortly after birth to 100% approximately 2 months after weaning. In fecal samples, T. vitulorum and S. papillosus were highest in 5 weeks old calves that was 13% and 15% respectively. It is obvious that T. vitulorum and S. papillosus may be maternally transmitted and may cross the placenta infecting fetus before birth. It may be passed primarily by colostrums from dam to calf. The use of ivermectin in the farm level may be the reason why the prevalence of gastrointestinal strongyles is low (5.2%) comparing to other reports. The low detection of Cryptosporidium by the copro-antigen ELISA comparing with the results of the fecal examination by acid fast stain is because of the fact that calves included in the study passing only few oocysts.

References