Austin Journal of Veterinary Science & Animal Husbandry

Open Access

Austin Publishing Group

Research Article

Prevalence and Species Identification of Calves Eimerosis in Sebeta Town, Oromia Specila Zone, Ethiopia

Ashagrie T[1]*, Zewde D[1], Yemanebrhan H[2], Yenew M[2] and Yalew B[1]

[1]Animal Health Institute, P.O. Box: 04, Sebeta, Ethiopia

[2]Samara University, Afar Samara, Ethiopia

***Corresponding author:** Tigist Ashagrie, Animal Health Institute, P.O. Box: 04, Sebeta, Ethiopia

Received: August 22, 2022; **Accepted:** October 03, 2022; **Published:** October 10, 2022

Abstract

A cross-sectional study was conducted from January 2021 to July 2022 with the objectives of estimating the prevalence of coccidiosis, identifying *Eimeria* species involved, and assessing the associated risk factors in randomly selected 9 kebeles of Sebeta town dairy farms. Three hundred five fecal samples were randomly collected from calves to examine for the presence of Oocyst of *Eimeria* by floatation technique using saturated salt solution. For positive samples, solution of 2.5% potassium dichromate was added to the feces containing the Ocysts for preservation and identification of the *Eimeria* species. The overall prevalence of coccidiosis at animal level and herd level was 57.5% (157/305) and 78.7% (48/61) respectively. The most dominant identified *Eimeria* species were *E. zuernii, E. auburnensis* and *E. canadinensis* with the prevalence of 45.22% (71/157), 17.83% (28/157) and 14.01(22/157) respectively. Under host related factor there was statistically significant difference ($p<0.05$) of sex, breed and fecal consistence with infection of *Eimeria* species but age, body condition and herd size were not significantly associated ($p>0.05$) with *Eimeria* infection. With regard to non-host related factor kebele, barn hygiene, management system, water and feed source was statistically significant ($p<0.05$) with *Eimeria* infection. However, house condition and pen type were not significantly associated ($p>0.05$) with *Eimeria* infection. By using univariable logistic analysis the risk of getting coccidian infection was observed in kebele, sex, breed, barn hygiene, management, water and feed source, but the risk factors such as; age, body condition, fecal consistency, herd size, house condition and pen type were found to be statistically insignificant for *Eimeria* infection rate ($p>0.05$). Indeed, the study revealed that calf coccidiosis is prevalent in dairy farms of Sebeta town. Hence, appropriate disease prevention and control program need to be undertaken to reduce its impact. More ever, we recommend to use PCR diagnostic technique which is more reliable, sensitive and less time-consuming for detection of *Eimeria*.

Keywords: Calve; Coccidiosis; *Eimeria*; Sebeta; Prevalence

Introduction

Food and Agricultural Organization (FAO) plotted that cattle population in the world reaches about 1.43 billion 1.87 billion of sheep and goats, 0.98 billion of pigs and 19.60 billion of chicken and this directly contribute world economy [1]. Ethiopia is gifted with abundant livestock resources of varied and diversified genetic roles with specific adaption to its wide range of agro ecologies. This great livestock potential is not properly exploited due to many prevailing socio economic values and attitudes, traditional management methods, limited genetic potential and rampant disease. In tropical countries like Ethiopia, who have undeveloped infrastructure coupled with poor management practice, low nutritional status, poor genetic make-up and disease considerably affect the productivity of this sector. The parasitic disease in his regard has been of paramount importance [2]. Among this parasitic disease; gastrointestinal parasite infections are a problem for both small and large scale farms; however, their impact is greater in sub-Saharan Africa [3].

Gastrointestinal parasites prevalence and severity of infection vary considerably depending on the genera of helminthes and protozoan parasites involved, animal species and local environmental conditions such as humidity, temperature, and rainfall, vegetation and management practices. This disease is usually the most and devastating protozoan disease in calves under age of one year [3]. Globally, Coccidiosis is one of the most common and important protozoan disease of cattle observed in almost all areas where cattle are raised and is usually most common and important in calves younger than one year of age [4]. The greatest economic losses are usually caused by acute diarrhea which accounts for approximately 75% of the mortality losses [5]. In other word Eimeria species are among the most common diarrhea causing protozoan enter pathogens which led to calf mortality, morbidity and those were produced by several *Eimeria* species of which *E.bovis* and *E. zuernii* are the most pathogenic species [6].

The disease of *Eimeriosis* affecting calves all over the world resulting in economic losses each year to dairy industries. In sever case this organisms damage the intestine by destroying epithelial cells and tissues, which interferes with the animal's ability to absorb nutrients; thus resulted in marked reduction in weight gain. As the disease progress, feed and water intake steadily declines, resulting in dehydrations and if weight loss encounter with dehydrations

Citation: Ashagrie T, Zewde D, Yemanebrhan H, Yenew M and Yalew B. Prevalence and Species Identification of Calves Eimerosis in Sebeta Town, Oromia Specila Zone, Ethiopia. Austin J Vet Sci & Anim Husb. 2022; 9(5): 1106.

cattle may die from cocciodiosis [7]. The disease spreads from one animal to another by contact with infected feces, it is one of the severe problems for calf rearing industry. Most common clinical manifestations include in-appetence, weakness, and loss of weight, diarrhea depression and anemia. Clinical cocciodiosis in cattle mainly depend on factors like *Eimeria species*, age of infected animal and number of ingested Oocyst. All calves reared in conventional systems are exposed to coccidian and can be infected early in life [8]. Reports on calve coccidiosis were enough in various parts of the country including Bishoftu and Addis Abeba but not in Sebeta town. But in the last five years no study (update) has been undertaken to assess the magnitude of this disease in this particular area. Hence the objectives of this study were to estimate the prevalence of *Eimeriosis* in dairy calves, identification of coccidian species and risk factors associated with the infection.

Materials and Methods

Study Area

The study was conducted from January 2021 to July 2022 in Sebeta town. Sebeta is a town and separate woreda in central Ethiopia part of Oromia special zone surrounding finfinne, The town is located at 25km southwest of Addis Ababa Jimma street, at latitude and longitude of $8^0$55'N, $38^0$39'E/8.917^{0}N 38.650^{0}E respectively. The altitude ranges from 1700 meters above sea level to about 3385 meters, and has a tropical wet and dry or savanna climate the districts yearly temperature is 15.27 degree centigrade. The town typically receives about 91.62 millimeters (3.61 inches) of precipitation and has 194.76 rainy days (53.336% of the time) annually [9]. The livestock production practiced in this area includes extensive, intensive and semi intensive management systems. The livestock population of the district is 7540 cattle, 2670 sheep, 1200 goat, 1620 horses, 765 mules, 3030 donkeys, 12380 poultry [9].

Study Population and Design

Cross sectional study was conducted from January 2021 to July 2022 in Sebeta town. The study population included both sexes, cross and local breeds of dairy cattle from birth up to 2 year of age belonging to dairy farms. The ages of calves were determined by collecting information from the dairy farm owners and then categorized in to birth to ≤6 months, 6-12 and >12-24 month. Body Condition Score (BCS) of the calves was estimated and scored in the range of 1-5 based on [10]. However, for the purpose of data analysis it was categorized in to three major categories, Poor (BCS: 1-2), Medium (BCS: 2-3.5), Good (BCS>3.5) [10].

Sample Size Determination

Sample size was calculated with an expected prevalence of 24.3% from the previous research work on prevalence of calf cocciodiosis in and around Addis Abeba [11]. The previous prevalence referred as assuming the agro ecology of Addis Abeba and Sebeta is to be the same and Sebeta town is adjacent to Addis Abeba city. The sample size to be collected for the study was determined using the formula described by Thrusfield [13] as follows:

$$n = \frac{1.96\,Pexp\,(1-Pexp)}{d^2}$$

Where, n= required sample size,

Pexp = expected prevalence,

d= desires absolute precision

1.96 = z- value for 95% confidence interval

The samples were collected from all existing kebele by allocating proportional number of dairy farms. Accordingly, the calculated sample size was 282, so total of 305 calve were sampled using a simple random sampling technique.

Sample Collection and Laboratory Methods Used

Fecal sample collection: About 305 fresh fecal samples with quantity of 30 gm were collected from the rectum of each sampled calves using sterile disposable plastic gloves. The samples were placed in a labeled clean plastic container (Universal bottle) and transported to Animal Health Institute, parasitological laboratory on the same day of collection. Samples were preserved at 4°C refrigerator until processed within 48 hours of arrival. At the time of sampling, variables such as; name of the farm (Owner), date of sampling, Keblele, age (<=6 months, 6-12 & 12-24 month), sex (Male & Female), breed (Local & Cross), body condition (poor medium & Good), consistency of the feces (Diarrheic, soft or normal), Barn hygiene (poor, good & very good), Hose type (Separated & unseparated), management system, (Intensive, Semi-extensive & extensive), feed source (Purchase & Grazing), Water sources (Pipe & River), Pen type (Concrete & Soil) and each species of Eimeria were recorded for each calf on a data recording format. Fecal samples were tested with a flotation method using saturated sodium chloride solution (specific gravity: 1.20) [12].

Coproscopical method: To determine Oocyst Per Gram (OPG) of feces, 3 gram of feces was weighed from each fecal sample. Ocysts were identified by using fecal flotation method. Briefly, 3 gram of intestinal content/feace was weighed using a digital balance and put into a mortar and mixed with 42 ml of floatation solution (Nacl). By using a pistol, it was thoroughly mixed and strained using a sieve into another beaker. The filtrate was poured into test-tube of respective sample and then the test tubes were placed in a test tube rack and each test tubes was filled to the brim with the flotation solution covered with a cover slip and left to stand for 10 minutes. The Test-tubes were gently lifted up then cover slips were placed on microscopic slides and examined at 10x and then 40x magnifications to identify the oocyst. For a sporulation of pathogenic *Eimeria* Oocyst, a solution of 2.5% potassium dichromate was added to each positive fecal sample, which contained most of the *Eimeria* oocyst in a beaker, mixed thoroughly with a wooden applicator and poured into a petri dish. Each petri dish was left on the bench for 10–14 days at room temperature to allow sporulation of *Eimeria* species [8].

***Eimeria* species identification:** The *Eimeria* species were determined based on the morphology of Oocyst and sporocysts (shape, color, micropyle and its cap, presence or absence of residual, polar granule) and time of sporulation [12]. The size of pathogenic Oocyst was measured using calibrated micrometer under a 40x objective of a microscope. For example microscopic morphology of the pathogenic species *E. bovis* is ovoid, yellow in color and has micropyle at narrow end and that of *E. zurnii* has spherical shape, colorless and does not contain micropyle. In relation to average dimension, *E. bovis* has about 27.7x20.3 microns & *E. zurnii* 17.8 x15.6 microns [13].

Data Management and Analysis

Data was recorded and coded using Microsoft Excel spreadsheet 2007 and analyzed using STATA version 13.0 for MA Windows (STATACorp. LP, Texas USA). The Prevalence was calculated by dividing the number of positive animals by the total number of animals tested for Eimeria infection. The analysis was done by comparing proportions (prevalence) distribution of positive and negative results using Pearson's chi-square test. Chi-square test was done to investigate level of the association between study site/ Kebele, age, sex, breed, body condition, consistency of the feces, Barn hygiene, Hose type, management system, feed source, Water sources, Pen type and species of Eimeria. Significance test was set at 5% alpha (P<0.05) and 95% confidence interval. Risk of getting coccidiosis for different factors/predictor variables were assessed by using univariable and multivariable logistic regression. Variables with a p-value greater 0.25 upon a univariable logistic regression model, no need of a further multivariable logistic regression analysis because of collinearity between them.

Results

Overall Prevalence of Calf *Eimeriosis*

Out of 305 fecal samples tested, 157 were found positive for *Eimeria* Oocyst and hence the overall prevalence was found to be 57.5% at animal level. Similarly, based on herd level prevalence of the disease, it was found in 48 of the total 61 herds the oocyst for the disease was examined. Hence the total herd prevalence for the current study showed 78.7%. The prevalence of *Eimeriosis* with respect to host factors revealed that the infection was higher in calves with 12 – 24 month (58.82%) than in calves with 6 – 12 month (52.42%) and with ≤6 month (46.01%) months old, but the difference between ages of the calves was not statistically significant (P=0.239). The prevalence shown between the sex of the calves and the study showed that the highest prevalence was recorded in male 61 (72.53%) than in female 96 (44.86%), and the difference is statistically significant (P=0.000). Among the calf breeds, a higher distribution of *Eimeriosis* infection was found in the local calves 42 (80.77%) than in the exotic breed 115 (45.45%), and statistically significant difference between the two breeds was observed (p=0.000). *Eimeriosis* infection was identified with a prevalence of 39 (51.31%), 34 (50.75%) and 84 (51.85%) in poor, medium and good body condition calves, respectively but not statistically significant (P=0.988). *Eimeriosis* infection with respect to fecal consistence revealed that much higher in non - diarrheic 156 (53.24) than diarrheic calves 1 (8.33), and statistically significant (P=0.0.002). *Eimeriosis* infection was notorious with a prevalence of 42 (58.33%), 83 (48.53%) and 32 (51.61%) in animal ≤10, 11-20 animal and ≥20 animal herd size, respectively but not statistically significant (P=0.378) as indicated in (Table 1).

Regarding environmental related factors high prevalence were recorded in kebele 07 (71.43%), kebele 05 (59.45%) and kebele 03 (57.44%), and statistically significant (P=0.000) respectively. Regarding barn Hygiene *Eimeriosis* infection was 30 (35.71%), 112 (56.85%) and 115 (62.50%) respectively, and this shows the high Prevalence found in very good barn hygiene and statistically significant (P=0.003). The occurrence of *Eimeriosis* was observed in extensive managed calves 37 (80.43%) than in intensively managed calves 120 (46.33%), and statistically significant (P=0.000) respectively. In in terms of water sources with respect to *Eimeriosis* infection was higher in river water source 37 (80.43) than pipe line water source 120 (46.33) and statistically significant (P=0.000) respectively. Regarding feed sources, *Eimeriosis* infection was higher in grazing 38 (80.86) than purchase 119 (46.33%) and this shows statistically difference (P=0.000) respectively, as shown in (Table 2).

Table 1: Prevalence of Calf *Eimeriosis* with respect to host factor.

Variable	Total sample tested	No of Positive	Percentage (%)	X^2	P-value
Sex				12.5675	0.000
Male	91	61	72.53		
Female	214	96	44.86		
Age				2.8617	0.239
≤6 month	113	52	46.01		
6 – 12 month	124	65	52.42		
12 – 24 month	68	40	58.82		
Breed				21.5364	0.000
Local	52	42	80.77		
Exotic	253	115	45.45		
Body Condition				0.0242	0.988
Poor	76	39	51.31		
Medium	67	34	50.75		
Good	162	84	51.85		
Fecal Consistence				9.3079	0.002
Non - Diarrheic	293	156	53.24		
Diarrheic	12	1	8.33		
Herd Size				1.9468	0.378
≤10 Animals	72	42	58.33		
11-20 Animals	171	83	48.53		
≥20 Animals	62	32	51.61		

Risk Factor Association with Respect to Calves *Eimeriosis* by Logistic Regression

In Univariate logistic regression analysis, seven risk factors affecting the prevalence of *Eimeriosis* in calves were identified. The prevalence of *Eimeriosis* was observed significantly (p>0.05) in Kebeles of the study area with OR of 20, 12 & 10 in Kebele, 07,05 and 03 respectively being more likely to contract *Eimeriosis* than Calves in the rest Kebeles (OR = 20.13, 95% CI = 5.46-19.71), (OR = 11.73, 95% CI = 3.33-41.30), (OR = 10.00, 95% CI = 2.84-40.90), (OR = 2.66, 95% CI = 0.36-19.71), (OR = 1.45, 95% CI = 0.21-9.98), (OR = 0.72.73, 95% CI = 0.67-71.80) and (OR = 0.88, 95% CI = 0.81-9.69). Odds of getting infection *Eimeriosis* high in male calves than female (OR = 0.40, 95% CI = 0.29-0.67). In the Univariate analysis, getting coccidian infection was higher in local calves than exotic (OR = 0.19, 95% CI = 0.09-0.41). Getting coccidian infection in very good barn hygiene was high than in good and poor (OR = 3, 95% CI = 1.17-7.67) and (OR = 2.37, 95% CI = 1.39-4.02). Similarly, in the Univariate analysis, the management system was found to affect the incidence of *Eimeriosis* infection in the study area (p<0.05).

Accordingly, calves on extensive farms were more likely to

Table 2: Prevalence of Calf *Eimeriosis* with respect to environment related factor.

Variable	Total sample tested	No of Positive	Percentage (%)	X^2	P-value
Kebele				58.2410	0.000
01	27	3	11.11		
02	13	2	15.38		
03	47	27	57.44		
04	10	1	10.00		
05	111	66	59.46		
07	77	55	71.43		
Tefki	8	2	25.00		
Korke	12	1	8.3		
Barn Hygiene				11.8024	0.003
Poor	84	30	35.71		
Good	197	112	56.85		
Very good	24	115	62.50		
House Condition				0.0285	0.866
Separated	90	47	52.22		
Unseparated	215	110	51.16		
Management System				18.1876	0.000
Intensive	259	120	46.33		
Extensive	46	37	80.43		
Water Sources				18.1876	0.000
Pipe	259	120	46.33		
river	46	37	80.43		
Pen Type				7.3696	0.007
Concrete	249	119	47.79		
Soil	56	38	67.86		
Feed Source				14.4003	0.000
Purchase	255	119	46.33		
Grazing	50	38	80.86		

develop *Eimeriosis* than calves on an intensive management system (OR = 0.20, 95% CI = 0.97-0.45). In the Univariate analysis, the water source was found as risk factor for the incidence of *Emeri*a ($p<0.05$). Accordingly, river water source were more likely to develop *Eimeriosis* than pipe line source (OR = 0.20, 95% CI = 0.97-0.45). With regard to feed source getting Eimeria infection in much higher in grazing than purchase source (OR = 0.27, 95% CI = 0.13-0.55). Other risk factors such as; age, body condition, fecal consistency, herd size, house condition and pen type were found to be statistically insignificant for *Eimeria* infection ($p>0.05$) as shown in (Table 3).

Based on the Eimeria spp. identification method, eight species such as *E. zuernii*, *E. bovis*, *E. subspherica*, *E. cylindrica*, *E. alabamensis*, *E. elipsoidalis, E. canadensis* and *E. auburnensis* were identified. The percentage of *Eimeria* species infecting calves was higher in *E. zuernii* (45.22%) followed by *E.* auburnensis (17.83%) and *E. canadennsis* (14.01%) as shown in table 4 and (Figure 1).

Table 3: Univariable logistic regression analysis of Calves *Eimeriosis* with presumed to factor.

Variable	Percentage	Univariable	
	(%)	COD (95% CI)	P-Value
Kebele			
01	11.11	*	*
02	15.38	1.45(0.21-9.98)	0.703
03	57.44	10.00(2.84-40.90)	0.000
04	10.00	0.88(0.81-9.69)	0.923
05	59.46	11.73(3.33-41.30)	0.000
07	71.43	20.13(5.46-73.24)	0.000
Tefki	25.00	2.66(0.36-19.71)	0.337
Korke	8.3	0.72(0.67-7.80)	0.793
Sex			
Male	72.53	*	*
Female	44.86	0.40(0.29-0.67)	0.000
Age			
≤6 month	46.01	*	*
6 – 12 month	52.42	1.29(0.77-2.15)	0.325
12 – 24 month	58.82	1.67(0.91-3.07)	0.096
Breed			
Local	80.77	*	*
Cross	45.45	0.19(0.09-0.41)	0.000
Body Condition			
Poor	51.31	*	*
Medium	50.75	0.97(0.50-1.88)	0.946
Good	51.85	1.02(0.59-1.76)	0.939
Fecal Consistence			
Non - Diarrheic	53.24	*	*
Diarrheic	8.00	0.07(0.10-0.62)	0.016
Herd Size			
≤10 Animals	58.33	*	*
11-20 Animals	48.53	0.67(0.38-1.17)	0.164
≥20 Animals	51.61	0.76(0.38-150)	0.436
Barn Hygiene			
Poor	35.71	*	*
Good	56.85	2.37(1.39-4.02)	0.001
Very good	62.50	3(1.17-7.67)	0.002
House Condition			
Unseparated	52.22	*	*
Separated	51.16	1.04(0.63-1.70)	0.866
Management System			
Intensive	46.33	*	*
Extensive	80.43	0.20(0.97-0.45)	0.000
Water Sources			
river	46.33	*	*

Pipe	80.43	0.20(0.97-0.45)	0.000
Pen Type			
Soil	47.79	*	*
Concrete	67.86	0.43(0.23-0.80)	0.008
Feed Source			
Grazing	46.33	*	*
Purchase	80.86	0.27(0.13-0.55)	0.000

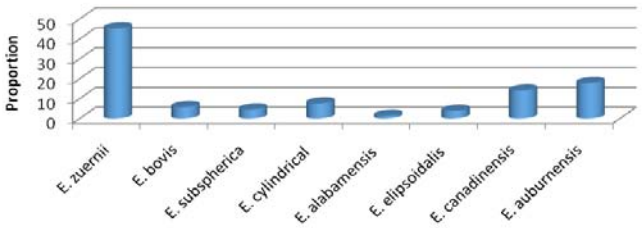

Figure 1: Proportion of *Eimeria* species.

Discussion

Coccidiosis causes great economic losses in calves as a result of decrease in feed efficiency which leads to slow weight gain and increased predisposition to other diseases [14]. The present study revealed animal and herd level prevalence of calf coccidiosis was 57.1% and 78.7% respectively. It is higher than the 26.04%, a report conducted by [15] in and around Holeta town, Finfine zuria special zone 18.5%, in Amhara region of Sekela district conducted by [16], 22.7%, in Dire Dawa by [7], 43.00% in Jimma town conducted by [17], 24.3% in and Around Addis Ababa conducted by [11], 34.1% in Jimma town conducted by [18], 19.10% in around Bahri Dar town conducted by [19] and 6.0% in and around Sekota town, North Wollo, Ethiopia reported by [4]. This may be different agro-ecological, seasonality. This finding was comparable to that of [20] who reported prevalence of 51.25% in Paraná state, Brazil. However, the present study was lower than the findings reported in Addis Ababa and Debrezeit by [21], which was 68% and in Mekelle, northern Ethiopia by [22] recoreded to be 72.7%,. The lower prevalence of coccidiosis recorded in this study as compared to the stated above could be due to the differences in agro-ecology, good management system and husbandry practices implemented. Additionally, this could also be due to the fact that the study has been conducted mainly in dry season hence, higher prevalence may be recorded if the study was carried out in rainy season [23].

The present study show that the species composition of Eimeria in calves were *E. zuernii* (45.22%) followed by *E.* auburnensis (17.83%) and *E. canadensis* (14.01%). This was higher than the finding among pathogenic species of Eimeria *E. zuernii* (26.6%) in Mekelle, northern Ethiopia reported by [22] *and E. zuernii* (19.2%), *E. alabamensis* (10.4%), *E. canadensis* (12.6%) in Hamedan province, Iran reported by [24]. However the present study was lower than the compositions of *E. zuernii* (51.4%), *E. alabamensis* (31.4%), *and E. canadensis* (11.4%) reported by [25] in Assiut Governorate. This might be due to difference in diagnostic method and agro-climate conditions.

The prevalence of Eimeriosis in the present study was significantly associated with factors such as sex, breed and fecal consistence. The prevalence in male calves was higher than female calves. This might be due to poor management to the male calves as compared to the female calves that are deemed to be future cows [7]. In contrary, previous studies done on adult cattle reported higher prevalence of Eimeriosis in female animals than in males [26]. This could be attributed to the physiological stress loaded on female's animals in relation to pregnancies and giving birth as compared to males [27]. The present study revealed that higher prevalence observed in local breed compared to the exotic breed calves that might be due to free ranging and grazing habit of local breeds that may expose local calves to Eimeria oocyst than exotic breeds [28,29]. But age, body condition and herd size were not significantly associated ($p > 0.05$) with *Eimeria* infection.

With regard to age previous studies in Ethiopia [21,7,8] showed that younger ages were strongly associated with Eimeriosis. However, numerically higher prevalence was observed in calves within the age of 6 to 12 than 1 to 6 months, which could be due to colostrum feeding at young age. Additionally, the older calves are stressed with feed change from milk to other feeds [27,21]. However, with consistency, calves with diarrheic cases were found to be more affected with Eimeriosis than that of calves with soft and normal feces. This finding agrees with the finding conducted in Dire Dewa, Eastern Ethiopia by [7]. However, it disagrees with the report from Abebe in Addis Ababa and Debre Zeit dairy farms by [21].

The prevalence of *Eimeriosis* in the present study was significantly associated with study kebeles ($p<0.05$). The difference in prevalence of the infection within the study kebeles might be due to difference in owners calf management, source of drinking water and difference in awareness created by different members of the government such as veterinarian in charges, development agents and others; on feeding methods, giving of clean drinking water, clearing of calf pen, clearing

Table 4: Morphological features of different *Eimeria* species in calves (n=305).

Eimeria species	No of infected	Percentage (%)	Shape	Size in um average	95% CI
E. Zuernii	71	45.22	Spherica	18.47 X16.52µm	0.37-0.53
E. bovis	9	5.73	Ovoidal	26.9X15.2µm	0.38-0.11
E. subspherica	7	4.45	Subspherica	11.6 X11µm	0.21-0.91
E. cylindrical	12	7.64	Cylindrical	23.3 X12.6µm	0.44-0.13
E. alabamensis	2	1.27	Subcylindrica	19.8X14.6µm	0.00-0.50
E. elipsoidalis	6	3.83	Ellipsiodal	22.2 X14.4µm	0.02-0.83
E. canadinensis	22	14.01	Ellipsoidal	30.4X20.3µm	0.09-0.20
E. auburnensis	28	17.83	Ellipsiodal to tapering	35.9 X23µm	0.12-0.24

of pen floor frequently and separation of calves from the dam within a short period of time to prevent the prevalence of the infection.

Non-host related factor such as kebele, barn hygiene, management system, water and feed source was statistically significant ($p<0.05$) with *Eimeria* infection. This agrees with the report of [7,30-32]. This might be due to poor sanitation in the calving and calf housing areas as well as poor management of housing favors infection of coccidiosis. Obviously, poor ventilation, droughts, poor calf nutrition, group pens, heavy stocking, cows present with calves, soiled bedding are regarded as risk factors for coccidiosis [33]. Eimeria infection with respect to management system, in line with the previous report of [34]. This variation might be due to hygienic condition of the barn, nutritional status of the calves, contamination level of the feed, water, floor and treatment given to the animals. However, house condition and pen type were not significantly associated ($p>0.05$) with *Eimeria* infection.

Conclusion and Recommendations

Coccidoisis is one of the most common and important diseases of cattle and it has been observed in almost all areas where cattle are raised. The disease is usually most common and important in calves younger than one year. In conclusion, the present study showed that 57.5% and 78.7% prevalence at animal level and herd prevalence and this study provides proof of a coccidian infection in dairy farms in Sebeta town and the most frequently identified species were *E. zuernii, E. auburnensis* and *E. canadinensis* respectively. In general, different risk factors were considered to affect the rate of infection of calves with this coccidian parasite. With regard to different risk factor like sex, breed and fecal consistence has association to the occurrence of coccidiosis. However, age, body condition and herd size were not significantly associated ($p>0.05$) with *Eimeria* infection. Barn hygiene, management system, water and feed source also have was significant association with *Eimeria* infection. However, house condition and pen type were not association with *Eimeria* infection. Based on the above conclusion the following recommendation was forwarded; calves having severe diarrhea should be isolated and treated with appropriate drug; any possibility of fecal contamination of farm, their feed and the calves be minimized risk of infection. Further epidemiological investigation through advanced diagnostic method are required to determine the coccidian parasite composition and their impact.

Acknowledgements

The authors would like to express all kinds of acknowledgement to animal Health Institute for allowing all the requested laboratory equipment, reagent and unreserved technical support.

Conflict of Interest

The author declares that there is not any conflict of interest with other concerned bodies in writing and publishing this article.

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