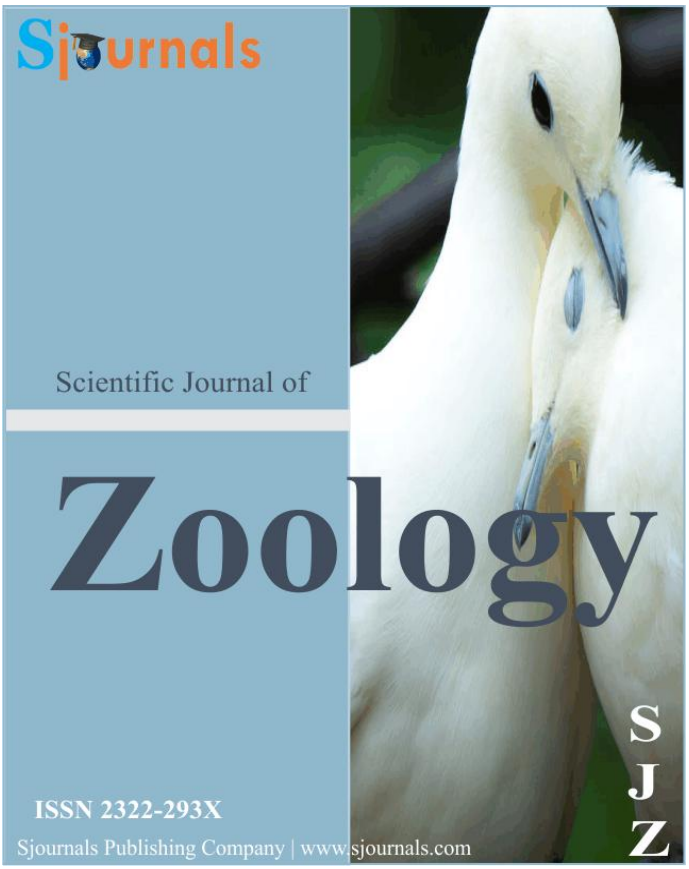
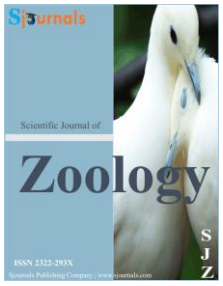


Sjournals
Scientific Journals
Scientific Journal of Zoology (2017) 6(9) 48-54
ISSN 2322-293X
doi: 10.14196/sjz.v6i9.2443



Contents lists available at Sjournals
Scientific Journal of **Zoology**
Journal homepage: www.Sjournals.com

Original article

Current status of calf coccidiosis managed under extensive and semi-intensive in Bekoji district, Arsi zone, Ethiopia

Gossa Regasa, Fikru Gizaw, Gelane Fekadu, Hailegebrael Bedada*
College of Veterinary Medicine, Samara University, P.O. Box 132, Semera, Afar, Ethiopia.

*Corresponding author: gorha2000@gmail.com

ARTICLE INFO

Article history,
Received 15 August 2017
Accepted 11 September 2017
Available online 18 September 2017
iThenticate screening 17 August 2017
English editing 09 September 2017
Quality control 16 September 2017

Keywords,
Bekoji
Calves
Coccidiosis
Prevalence
Risk factors

ABSTRACT

A cross sectional study was conducted from November 2016 up to April 2017 in Bekoji district to determine the current status of calf coccidiosis. A total of 384 calves with the age of up to one year were subjected to coprological investigation. Based on the coprological investigation the overall prevalence of coccidiosis was 186 (48.4%). Coccidiosis was higher in calves above 6 months of age than calves with age less than 6 months (P<0.05). The present study showed that there was significant difference (P<0.05) in the prevalence of coccidiosis among the husbandry systems of calves with the highest prevalence in semi-intensive system (55.6%). There was also significant variation observed (P<0.05) between local breeds and cross breeds. The highest prevalence of coccidial infection was recorded in calves with poor hygienic condition (53.2%) than in good and medium hygienic status (36.9% and 47.3%) (P<0.05). Likewise, significant variation in prevalence was observed between poor body condition and good body condition calves (P<0.05). However, significant difference in prevalence was not observed between different sex, and PAs. The present study showed that calves coccidiosis was one of the important diseases in the study area. Hence, appropriate disease prevention and control measures and further molecular investigations to determine the circulating Eimeria species should be implanted.

1. Introduction

Bovine coccidiosis is one of the most common parasitic diseases of cattle that prevail widely in different parts of the world. More than twelve different species of Eimeria in cattle and buffalo have been documented until now. Most commonly prevalent species are E. bovis, E. zuernii, and E. auburnensis. E. bovis and E. zuernii are highly pathogenic causing mortality and morbidity by disturbing absorption mechanisms (Lassen et al., 2009). Coccidiosis is responsible for major economic losses in livestock production worldwide (Nisar-Khan et al., 2013). Adult animals are usually asymptomatic carriers that often serve as a source of infection for young, which are more susceptible to infection (Faber et al., 2002; Abede et al., 2008). Eimeria is very host specific which limits the infection transmission to come from other cattle and occasional passive transfer of oocysts. The oocysts require sporulation time in external environment ranging from a few days to weeks depending on the species, humidity, temperature, and other environmental factors (Daugschies and Najdrowski, 2005). The oocysts are very resistant and can under favorable conditions survive minus degrees of temperature for long times that can span the winter (Svensson, 1995).

In severe cases, these organisms damage the intestine by destroying epithelial cells and tissues, which interferes with the animal's ability to absorb nutrients. The result is a marked reduction in feed efficiency and weight gain. As the disease progresses, feed and water intake steadily declines, resulting in dehydration. If weight loss and dehydrations are severe enough, cattle may die from coccidiosis. Moreover, it results in failure of young stock to gain weight and to grow to their full potential (Nisar-Khan et al., 2013). Usually clinical coccidiosis is a result of the interaction of several factors, including age of the animals, the number of ingested oocysts, production systems and management practices, hygienic conditions, stable temperature, season and the level of stress for the animals, which may favor a clinical outbreak of coccidiosis (Lassen et al., 2009; Rehman et al., 2011).

Calves are usually the most affected of all age groups and show the clinical form. They appear unthrifty, perineum stained with feces, watery feces sometimes with blood (Maas, 2007). Severely infected animals present with thin bloody diarrhea, which may persist for about one week, or merely thin feces with shreds of intestinal epithelium and mucus and eventually anemia may develop (Coetzer and Justin, 2004). Dehydration, weight loss, depression, anorexia, straining after defecation and occasionally death may occur (Kennedy, 2000; Maas, 2007). Mortality is, however acute as a result of the infection or later due to secondary complications (The Merck Manual, 2005). Less severe infections in which the animal survives and develops resistance, may nevertheless affect the growth and health of an animal thus the animal remains stunted (Kennedy, 2000; Maas, 2007).

Although coccidiosis is an important cause of calf morbidity and mortality in Ethiopia, very little attention has been given to this disease. While few studies have been undertaken in various parts of the Ethiopia (Rahmeto et al., 2008), no previous studies has been undertaken to assess the magnitude of this disease in Bekoji district. Therefore, the objective of this study was to determine the current status of calf coccidiosis in selected dairy farm and free range managed calves of Bekoji district.

2. Materials and methods

2.1. Description of study area

The study was conducted in and around Bekoji town which is found in Lemuna Bilbilo Woreda, Arsi Zone of Oromia Regional State of Ethiopia. It is located 231 Km in the South Eastern side of Addis Ababa and 56 kms in the South of the Zonal town called Assela. Astronomically Bekoji town has latitude of 7° 35' N -39° 10' E and longitude of 7.6° N -39.2° E with an elevation of 2810 meters (Bekoji Town Municipality, 2013). The area has highland escarpment above 2400 meters. The mean maximum and minimum temperature are 28°C and 10°C, respectively. The annual rainfall is 700-1658 mm with a bimodal rainfall occurring from March to April (short rainy season) and from July to October (long rainy season). Keeping livestock like cattle, small ruminants, chickens, equine and honeybee for income, draft power, milk, meat, honey, hide and skin and economic asset is the main activity next to crop production in Bekoji district.

2.2. Study population

The study was conducted on local and cross-breed calves selected from 6 Peasants association found in Bekoji district. The study incorporated calves less than one year of age and managed extensively and semi-

intensively. The age of calves was determined according to Pace and Wakeman (2003) as well as by the information gathered from the owners.

2.3. Study design and sample size determination

Cross-sectional study was conducted from November 2016 to April 2017 to determine the prevalence and associated risk factors of calf coccidiosis in Bekoji district. The sample size required for the study was determined using the formula given by Thrustfield (2005). To calculate the sample size, 50% expected prevalence with 95% confidence level and 5 % of desired absolute precision was used.

$$n = \frac{(1.96)^2 pe \times p(1-pexp)}{d^2}$$

Where, n = required sample size, pexp = expected prevalence, d^2 = desired absolute precision at 95% confidence level. Therefore, based on the above formula 384 calves were sampled.

2.4. Sampling method

The study of calve coccidiosis involves district, peasant associations (PAs) and calves as a sampling unit. The district was selected purposively based on the previous history of calve coccidiosis investigation and animals population; however, six PAs were selected randomly from the district. Calves found in the PAs were selected randomly from the herd or farm containing calves. The hygienic status of calf pens and the calves themselves were assessed based on housing system (ventilation, draughts, group pens, heavy stocking), sanitation of bedding (soiled bedding) and body parts of the calves (Curt 2005) and was conveniently categorized as poor, moderate and good.

2.5. Sample collection and laboratory investigation

A fresh fecal sample of about 30gm was taken from the rectum of each calf using sterile disposable plastic gloves. The sample was placed in a labeled clean glass bottle container and transported to the parasitology laboratory on the same day and was kept at 4°C in a refrigerator until processing within 48 hours of arrival. At the time of sampling, the name of the PAs, date of sampling, the age, sex, breed, body condition, hygiene, and management were recorded for each calf on a recording format.

2.6. Statistical analysis

Data was recorded and entered to Microsoft Excel sheet and analyzed by using SPSS version 20. Chi square test were implemented to test the association between coccidiosis and various risk factors (breed, age, sex, body condition, hygiene and management). In the analyses, the confidence level was held at 95% and *P*-value less than 0.05 was considered as significant.

3. Results and discussion

3.1. Overall prevalence

Coprological examinations revealed out of 384 calves examined for the presence of oocyst 186 (48.4%) were found to be positive for coccidiosis.

3.2. Sex wise prevalence

Coccidiosis prevalence in female and male calves of the study area was 44.9% and 51.4% respectively. Statistically significant difference in the prevalence of coccidiosis was never recorded between male and female calves of the study area (p>0.05) (Table 1).

Table 1
Sex correlated prevalence of coccidiosis.

Sex	Calves examined	Infected calves	Prevalence %	SE	p-value
Male	208	107	51.4%	0.225	0.418
Female	176	79	44.9%		
Total	384	186	48.4%		

3.3. Age wise prevalence

The parasitic prevalence in calves less than six months of age and calves greater than six months of age was 31.5% and 61.2% respectively. Significantly higher prevalence of coccidiosis was recorded in calves of greater than six months of age (p= 0.000) (Table 2).

Table 2
Prevalence of coccidiosis in association with age.

Age	No examined	No of positive	Prevalence %	SE	P-value
1-6 month	165	52	31.5%		
>6 month	219	134	61.2%	0.227	0.000
Total	384	186	48.4%		

3.4. Breed wise prevalence

The prevalence of coccidiosis in local and cross breed calves of the study area was 40% and 52% respectively. Significant disparity in the occurrence of coccidiosis was found among cross breed calves and local calves of the study area (p = 0.000) higher in cross breeds than local breeds of the study area (Table 3).

Table 3
Breed wise prevalence of coccidiosis.

Breed	Examined calves	Infected calves	Prevalence %	SE	P-value
Local	113	45	40%		
Cross	271	141	52%	0.243	0.000
Total	384	186	48.4%		

3.5. Management wise prevalence

The prevalence of coccidiosis was 55.6% and 46.5% in calves managed under semi-intensive and extensive production system respectively. Significance difference in prevalence of coccidiosis infection (P = 0.031) was observed between calves managed under semi-intensive and extensive production system of the study (Table 4). The prevalence is significantly higher in the calves kept under semi-intensive production system.

Table 4
Management wise calves coccidiosis.

Management	Examined calves	Infected calves	Prevalence %	SE	P-value
Extensive	303	141	46.5%		
Semi-intensive	81	45	55.6%	0.298	0.031
Total	384	186	48.4%		

3.6. Hygiene associated prevalence

Coccidiosis occurrence in calves managed in poorly, moderately and highly hygienic house was 53.2%, 47.3% and 36.9% respectively. Significant disparity in the prevalence of coccidiosis was found among calves reared in poorly, moderately and highly hygienic state (p = 0.025) highest prevalence of coccidiosis was observed in herd managed under poor hygienic state than moderate and good (Table 5).

Table 5
Hygiene wise prevalence of coccidiosis.

Hygiene status	No examined	No positive	Prevalence %	SE	P-value
Poor	190	101	53.2%	0.139	0.025
Medium	129	61	47.3%		
Good	65	24	36.9%		
Total	384	186	48.4%		

3.7. Body condition related prevalence

The prevalence of coccidiosis in poor, medium and good body condition calves was 43.5%, 47.9% and 16.7 respectively. Significant difference in the occurrence of calves coccidiosis was observed (p = 0.000), higher in medium body condition calves than poor and good body condition animals (Table 6).

Table 6
Occurrence of parasite in relation to the body condition.

Body condition	Examined calves	Infected calves	Prevalence %	SE	P-value
Poor	177	100	43.5%		
Medium	165	79	47.9%	0.174	0.000
Good	42	7	16.7%		
Total	384	186	48.4%		

3.8. Prevalence among peasant association/kebeles

Peasant association (kebele) wise prevalence of calves coccidiosis in Bekoji negeso, Bekoji 02, Dawa Barsa, Koma Katar, Limu mikael and Hulule Hasa was 40.5%, 56.9%, 40.8%, 56.6%, 46.6% and 50.9% respectively. Difference in the occurrence of coccidiosis among the PAs of the study area was insignificant (p = 0.243) (Table 7).

Table 7
Prevalence of coccidiosis based on the site.

Site	No examined	No positive	Prevalence %	SE	P-value
Bekoji Negeso	74	30	40.5%	0.069	0.243
Bekoji 02	65	37	56.9%		
Dawa Barsa	49	20	40.8%		
Koma Katar	53	30	56.6%		
Limu Mikael	88	41	46.6%		
Hulule Hasa	55	28	50.9%		
Total	384	186	48.4%		

Results presented in this study revealed overall prevalence of coccidiosis is 48.4%. This finding is inline with the study conducted by (Yadessa et al., 2014). The prevalence of calf coccidiosis of the current study is higher than reports from different parts of Ethiopia (Ferid et al., 2012; Alula et al., 2013; Getahun, 2016; Mohammed et al., 2016; Tigist et al., 2017). However, the current study result was much lower than the finding of (Rodriguez et al., 1996; Abebe et al., 2008; Dejena et al., 2016). This disparity is most probable attributed to the differences in agroecology and husbandry practices of the study animals in different agro ecologies (Radostits et al., 2006).

Statistically insignificant association (P>0.05) among sex and coccidia infection was observed. This finding agrees with reports of (Abebe et al., 2008; Alemayehu et al., 2013; Alula et al., 2013; Dejene et al., 2016; Mohammed et al., 2016). Finding of insignificant variation among the sexes of the study animals indicates that sex not play a role on the occurrence of coccidian infection. This is because of either equal chance of accessing the oocytes or no difference on protective immunity for the disease. Yet, a bit higher prevalence of the parasite in male calves could be due to the farmers pays attention and safety to the female calves as they deemed to be replacement stock of cows.

Significant association (P<0.05) among the age of the calves with the risk of coccidiosis was observed; in which the prevalence of coccidia appeared to follow an age pattern. Higher infection rate was recorded in calves greater than 6 months of age than calves of less than 6 months of age due to the fact that there was good nursing of the colostrum feeding for younger calves. During investigation most calves older than 6 months were managed in crowded house condition, pay less attention and in close contact with adults. Hence, the chance of lick each other and ingest large number of oocysts is high, which is in agreement with previous reports (Rodriguez-Vivas et al., 1996; Radostits et al., 2006; Abebe et al., 2008; Alula et al., 2013; Mohammed et al., 2016; Tigist et al., 2017). Seasonal occurrence of coccidiosis in calf is common; when young calves are brought together for weaning or moved into feedlots or fed in small areas for the winter months. The prevalence of infection and the incidence of clinical disease are also age related (Radostits et al., 2006). However, this finding is in disagreement with the report of (Getahun, 2016).

During investigation, breed (Local 40.06%, Cross 52%) of calves was demonstrated statistically significant variation (P<0.05) to coccidiosis. This finding is inline with the findings of other work (Dejene et al., 2016; Getahun, 2016). However, the current finding is unlike with previous studies indicating that there was no statistical significant relationship between breed and coccidian infection (Abebe et al., 2008; Alemayehu et al., 2013; Alula et al., 2013; Mohammed et al., 2016). This is due to either unequal likelihood of being infected with coccidiosis or no difference on protective immunity for the disease. The stronger association (P<0.05) of coccidial parasite in relation to the hygienic status (Good 36.9%, Medium 47.3% and Poor 53.2%) of calves has been recorded in this study. Consequently, calves belonging to poor hygiene illustrated significantly higher prevalence than calves belonging to medium and good hygiene. This result inline with the findings of; (Mehreteab et al., 2012; Dejene et al., 2016; Getahun et al., 2016). This could imply that poor sanitation in the calving and calf housing areas as well as poor management of housing favors infection with coccidiosis. Obviously, poor ventilation, droughts, poor calf nutrition, group pens, heavy stocking, cows present with calves, soiled bedding were regarded as risk factors for coccidiosis (Radostits et al., 2006). However, this finding is not inline with the findings showed that hygiene and coccidian infection have no association (Mohammed et al., 2016).

The influence of management system on the occurrence of coccidian has indicated that there was statistically significant relationship between them (P<0.05). This finding is inline with the reports of other studies (Dejene et al., 2016; Tigist et al., 2017). However, this finding also disagrees with the previous reports by (Alemayehu et al., 2013; Getahun, 2016) indicating that there was no statistical significant association between the occurrence of coccidial infection and management system. This might be attributed to the fact that hygienic system of the barn, nutritional status and contamination of the feed or overcrowding of the animal was different in all management systems. Moreover, management factors may also be related to greater susceptibility of cattle to coccidial infection. Calves that are reared under artificial conditions are exposed to greater numbers of risk factors for the coccidiosis, such as: early weaning, failure to ingest colostrum and difficulty in adapting to artificial high-density diets. Pasture with high concentrations of animals also present greater quantities of feces deposited, and consequently, greater contamination of the ground with parasite eggs and oocytes, which constitutes a risk for susceptible calves (Jolley and Bardsley, 2006). It is important to emphasize that, even in the subclinical form the lesions caused by different species of this parasite may be related to lower nutrient absorption, with an effect on the performance, health and production of the animals (Lassen et al., 2009).

The association (P< 0.05) of coccidial infection in relation to the body condition of calves has been shown in the current study. Consequently, calves with poor and medium body condition indicated significantly higher prevalence than calves of good body condition. This result agrees with the report of (Mehreteab et al., 2012; Getahun, 2016; Mohammed et al., 2016; Tigist et al., 2017). The existence of parasite in the GIT it induce destruction of intestinal villi that interfere with absorption of nutrient hence, the animals may not at good physical state (Radostits et al., 2006). However, the current finding is disagree with the findings of (Alemayehu et al., 2013).

4. Conclusion

The current finding has revealed that the prevalence of calves coccidial infection in Bekoji district was 48.4%. Hence, this study indicates the coccidial infection is high and could potential pose significant economic problems to livestock producer. The prevalence was significantly influenced by age, breed, production system, hygiene status, and body condition score of the animals. However, prevalence of the disease was not attributable to the sex of calves and PAs of the study area. Therefore, further epidemiological investigation in different season of the year should be carried out to look at the effect of season on prevalence of the disease and other stressor factors.

Acknowledgements

The authors would like to express our deepest gratitude to the staff members of Asella Regional Veterinary Laboratory and Samar University for their cooperation to accomplish this work.

References

Abede, R., Wossene, A., Kumsa, B., 2008. Epidemiology of Eimeria infections in calves in Addis Ababa and Debre Zeit dairy farms, Ethiopia. Int. J. App. Res. Vet. Med., 6(1), 24-30.

Alula, A., Mohammed, N., Timketa, B., 2013. Prevalence of bovine coccidia in Kombolcha district of South Wollo, Ethiopia. J. Vet. Med. Anim. Health, 5(2), 41-45.

Coetzer, J., Justin, R., 2004. Infectious diseases of livestock. Second edition; Oxford University press. 3, 319-331.

Curt A. Gooch, 2005. Senior Extension Associate, Department of Agricultural and Biological Engineering, PRO-DAIRY Program, Cornell University. Dairy Calves and Heifers: Integrating Biology and Management Conference, January 25-27. Syracuse, NY. NRAES-175.

Daugschies, A., Najdrowski, M., 2005. Eimeriosis in cattle: current understanding. J. Vet. Med. B Infect. Dis. Vet. Public Health, 52, 417-427.

Dejene, A., Yosef, D., Nuraddis, I., 2016. Prevalence and associated risk factors of calf coccidiosis in and around Asela town, Southeast Ethiopia. J. Nat. Sci. Res., 6(3).

Faber, J.E., Kollmann, D., Heise, A., Bauer, C., Failing, K., Burger, H.J., 2002. Eimeria infection in cows and their calves: Oocyst extraction and levels of specific serum and colustrum antibodies. Vet. Parasitol., 104, 1-17.

Ferid, D., Yeshitila, A., Mihreteab, B., 2012. Calf coccidiosis in selected dairy farms of Dire Dawa, Eastern Ethiopia. Global Vet., 9(4), 460-464.

Getahun, K.T., 2016. Epidemiological studies on calve coccidiosis in dairy farms in South Wollo zone Amhara region, Ethiopia. J. Vet. Sci. Technol., 7, 6.

Jolley, W.R., Bardsley, K.D., 2006. Ruminant coccidiosis. Vet. Clin. N. Am., 613-621.

Kennedy, M., 2000. Coccidiosis in cattle. Health management section of the Alberta Feedlot, manual UK.

Lassen, B., Viltrop, A., Raaperi, K., Jarvis, T., 2009. Eimeria and Cryptosporidium in Estonian dairy farms in regard to age, species and diarrhoea. Vet. Parasitol., 212-219.

Maas, J., 2007. Coccidiosis in cattle. UCD Vet Views. Carlifornia Cattlemen's Magazine. Management Guide, 145-49

Mehreteab, B., Ferid, D., Yeshitila, A., 2012. Calf coccidiosis in selected dairy farms of Dire Dawa, Eastern Ethiopia. Global Vet., 9, 460-464.

Mohammed, N., Mukarim, A., Feyissa, B., Benti, D., 2016. Study on prevalence and risk factors of calf coccidiosis in and around Jimma town, Southwest Ethiopia. Ethiop. J. Appl. Sci. Technol., 7(2), 21-28.

Nisar-Khan, M., Rehman, T., Sajid, M.S., Abbas, R.Z., Zaman, M.R., Sikandar, A., Riaz, M., 2013. Determinants influencing prevalence of coccidiosis in Pakistani buffaloes. Pak. Vet. J., 33(3), 287-290.

Pace, J.E., Wakeman, D.L., 2003. Department of animal science, cooperative extension service, institute of food and agricultural sciences, university of Florida, Gainesville, 32611.

Radostits, O.M., Gay, C.C., Constable, P.D., 2006. Veterinary Medicine. A text book of the disease of cattle, horse, sheep pigs and goats, 10th ed, Sanders, Edinburgh, 969-984.

Rahmeto, A., Abebe, W., Bersissa, K., 2008. Epidemiology of Eimeria infections in calves in Addis Ababa and Debre Zeit dairy farms, Ethiopia. Int. J. Appl. Res. Vet. Med., 6, 24-30.

Rehman, T.U., Khan, M.N., Sajid, M.S., Abbas, R.Z., Arshad, M., Iqbal, Z., Iqbal, A., 2011. Epidemiology of Eimeria and associated risk factors in cattle of district Toba Tek Singh. Pak. Parasitol. Res., 108, 1171-1177.

Rodriguez-Vivas, R.I., Dominguez-Alpizar, J.L., Torres-Acosta, J.F., 1996. Epidemiological factors associated to bovine coccidiosis in calves (*Bosindicus*) in a sub humid tropical climate. Rev. Biomed., 7, 211-218.

Svensson, C., 1995. Survival of oocysts of Eimeria alabamensis on pastures under different climatic conditions in Sweden. Acta. Vet. Scand., 36, 9-20.

Thrusfield, M., 2005. Veterinary epidemiology, 2nd ed. UK: Blackwell Science, 178-187.

Tigist, T., Merzuk, H., Gobu, B., Mukarim, A., 2017. Study on prevalence of calves coccidiosisi in and around Jimma town, Ethiopia. J. Vet. Med. Res., 4(3), 1077.

Yadeessa, T.K., Awash, H.D., Gurmu, G.K., 2014. Prevalence of calves coccidiosis in Jimma town dairy farms, South-Western Ethiopia. Sci. J. Zool., 3, 36-44.

How to cite this article: Regasa, G., Gizaw, F., Fekadu, G., Bedada, H., 2017. Current status of calf coccidiosis managed under extensive and semi-intensive in Bekoji district, Arsi zone, Ethiopia. Scientific Journal of Zoology, 6(9), 48-54.