World's Veterinary Journal
World Vet J, 6(3):137-142, September 25, 2016
ISSN 2322-4568

Prevalence of *Cysticercus Tenuicollis* in Small Ruminants Slaughtered at Addis Ababa Abattoir, Ethiopia

Tesfaye Bejiga[1,2], Abraham Haile[3], Taye Solomon[2], Dessalegn Sefir[3]and Mahendra Pal[1]*

[1] *College of Veterinary Medicine, Addis Ababa University, Debre Zeit, P.O. Box 34, Ethiopia*
[2] *Veterinary Drug and Feed Administration and Control Authority (VDFACA), P.O. Box 31303, Addis Ababa, Ethiopia*
[3] *Ethiopian Public Health Institute, P.O. Box 1242, Addis Ababa, Ethiopia*
*Corresponding author's Email: palmahendra2@gmail.com

ABSTRACT

Parasitic diseases in general and *Cysticercus tenuicollis* in particular are responsible for the low productivity of livestock. A study to determine the prevalence of *C. tenuicollis* in sheep and goats at Addis Ababa abattoir, Ethiopia. A cross sectional study was conducted and a stratified random sampling technique was employed where by sheep and goats to be slaughtered were categorized into two groups based on their sex (male and female) and also based on their age (young and adult) only in case of sheep. The statistical analysis was performed using SPSS program and Chi square. The overall prevalence of *C. tenuicollis* from 900 shoats was found to be at 355 (39%). Out of the 600 sheep inspected *C. tenuicollis* was detected in 223 (37.2%) and from 300 inspected goats *C. tenuicollis* was observed in 132 (44%). The age wise prevalence *C. tenuicollis* showed that the prevalence was higher in adult sheep (46%) than young sheep (28.3%). The prevalence of *C. tenuicollis* based on their sex was higher in female goats (45.3%) and sheep (37.8%) than in male goats (42.7%) and sheep (35.7%) with no significant statistical difference (P>0.05). Although organ wise infection rates of both goats and sheep were 5.7% and 3.7% (mesentery), 0.7% and 0.2% (diaphragm), 0% and 0.2% (uterus), and 0.3% and 0% (rectum) with no significant statistical difference. However, in other infected organs, there was a significant statistical difference 39% and 34.2% (omentum), 14.7% and 7.8% (liver) and 3% and 0.8% (lung) in goats and sheep, respectively. The overall percentage of *C.tenuicollis* was higher in adult sheep (10.7%) than in young sheep (5%) with significant statistical difference (P<0.05).

Keywords: Addis Ababa, *Cysticercus tenuicollis*, Goat, Prevalence, Sheep, Visceral organ

ORGINAL ARTICLE
pii: S2322456816000020-6
Received: 14 Aug 2016
Accepted: 12 Sep 2016

INTRODUCTION

Ethiopia with its great variation in climate and topography possesses one of the largest small ruminant populations in the world, which is mostly kept by small holder farmers and managed under extensive husbandry system (ILCA, 1993). Their ability to utilize wider variety of plant species, their short generation cycle and high reproductive performance make sheep and goats complementary to cattle and camel production (Ibrahim, 1998). Sheep and goat are major source of income (cash) for the poor rural farmers in most parts of tropics including Ethiopia (Devendra and Mcleory, 1990; Ibrahim, 1998). However, the full exploitation of these resources is hindered in the tropical environment, due to a combination of factors such as drought, poor genetic potential and backward animal husbandry practice and due to the prevalence of diseases (Schillorn van Veen, 1985 and Ibrahim, 1998).

Parasitic diseases are significant causes of morbidity and mortality in humans as well as in animals (Pal, 2007 and et al., 2014), and are mostly found in warm tropical and sub-tropical regions of the world (Hadush and Pal, 2016). Many parasitic diseases are prevalent in Ethiopia, which are responsible for the low productivity of livestock besides contributing to reduced meat production due to carcass or organ condemnation (Abebe, 1995; Kebede et al., 2013; Nasr and Pal, 2016). In Ethiopia, parasitic diseases including *C. tenuicollis* in small ruminants were implicated as cause of organ condemnation in Abattoir enterprise leading to significant economic loss (yehualashet et al., 2012). *C. tenuicollis* is the cystic stage of *Taenia hydatigena*, which is found in the small intestines of dogs and cats. Cysts of *C. tenuicollis* are responsible for a high degree of morbidity and mortality in livestock (Abidi et al., 1989). Ova passed with dog feces are ingested by intermediate hosts such as sheep and goat with pasture contaminated with the eggs. After ingestion the larvae, which develop penetrate the small intestine and disseminate to various tissues, especially the liver, omentum, mesentery, and peritoneum. If the larvae reach the liver surface, they develop into thin walled fluid filled bladders and if

To cite this paper: Bejiga T, Haile A, Solomon T, Sefir D and Pal M. 2016. Prevalence of *Cysticercus Tenuicollis* in Small Ruminants Slaughtered at Addis Ababa Abattoir, Ethiopia. *World Vet. J.* 6(3): 137-142.
Journal homepage: www.wvj.science-line.com

they fail, they degenerate and become calcified. Migration through the liver leaves grayish white tortuous tracts. Heavy infestation in young animals causes liver damage and hemorrhages or peritonitis (Soulsby, 1989).

When many embryos migrate simultaneously through the liver, clinical signs may be seen. The migration may cause severe destruction of the liver tissue and the pathology seen in the liver may be similar to that observed in liver fluke infection (Jorgan and Brian 1994). A serious condition known as" hepatitis cysticercosis" caused by *C. tenuicollis* in different animals was described by many workers (Pathak et al., 1982 and Soulsby, 1989). In extremely heavy infection, the viscera may become knotted together and organ function may be impaired. Degenerated cysts are replaced by caseous and calcareous debris and may damage tissue. If large numbers of larvae migrate through the liver parenchyma, tissue will be damaged and acute and fatal hepatitis may be the result (Pathak et al., 1982).

Even though various investigations have been conducted to determine the prevalence of parasitic diseases resulting in organ condemnation in Ethiopia (Jemberie, 2002; Yimam, 2003 and Asefa, 2005), most of the survey paid little attention to the study of *C. tenuicollis*. Therefore, the objectives of the abattoir survey were to determine the prevalence of *C. tenuicollis* in sheep and goats slaughtered at Addis Ababa abattoir, to find out the distribution of *C. tenuicollis* in visceral organs of sheep and goats and also to assess the relationship between some risk factors and prevalence of *C. tenuicollis* in sheep and goats.

MATERIALS AND METHODS

The study was conducted from November 2008 to March 2009 at Addis Ababa abattoir, Ethiopia. Adds Ababa is located at an elevation of about 2,400 meters above sea level and receives an annual rainfall of 1800 mm in bimodal pattern. The long rainy season extends from June to September followed by a dry season ranging from October to February. The short rainy season lasts from March to May. The average minimum and maximum temperatures are 10.7^0C and 23^0 C, respectively (AACA, 2004). The animals included in the study were male and female, young and adult sheep and goats of local breeds brought from different localities around Addis Ababa, Ethiopia.

In this study, animals were classified into two species: sheep and goats, two age groups (young and adult) two sexes (male and female) and two origins (highland and lowland). Age was determined by observation of the erupted permanent incisors and classification in to two age groups was performed according to Gatenby (1991) and Steel (1996). Areas above 1500 MASL was considered as highland and lower than 1500 MASL was considered as lowland. Sex was determined by observation. On Postmortem inspection, visceral organs such as liver, omentum, mesentery, diaphragm, uterus and rectum were examined visually for the presence of *C. tenuicollis.* Transparent cyst filled with fluid and presence of white dot indicating scolex was considered as *C .tenuicollis.* The raw data generated during postmortem meat inspection were entered into MS Excel program and the statistical analysis was performed by using SPSS program for windows (version 15.0, 2008). Descriptive statistics such as percentage was used to determine the rate of infection. The variation between infection rates of specific organs, age, and species of animals were evaluated by Pearson's chi-square (X^2) and differences were regarded as statistically significant if P-value is less than 0.05.

Ethical Approval

The study considered direct observation of slaughter animals in the abattoir and no animal was subjected to suffering as a result of the study. Nevertheless, ethical clearance on scientific soundness and justification for the need to do the study was addressed by the Addis Ababa University College of Veterinary Medicine.

RESULTS

During the study period, a total of 900 shoats were slaughtered and inspected for the presence of *C. tenuicollis*. The overall prevalence of *C. tenuicollis* was 355 (39 %) and the prevalence in sheep and goats were 37.2% and 44%, respectively with a significant statistical difference (P<0.05) between the two species (Table 1).

Table 1. The prevalence of *Cysticercus tenuicollis* in sheep and goats slaughtered at Addis Ababa abattoir, Ethiopia during November 2008 -March 2009

Species	No examined	Prevalence N (%)	P–value
Sheep	600	223(37.2)	0.008
Goats	300	132(44)	
Total	900	355 (39)	

N= Number of infected animals

To cite this paper: Bejiga T, Haile A, Solomon T, Sefir D and Pal M. 2016. Prevalence of *Cysticercus Tenuicollis* in Small Ruminants Slaughtered at Addis Ababa Abattoir, Ethiopia. *World Vet. J.* 6(3): 137-142.
Journal homepage: www.wvj.science-line.com

Out of 300 sheep inspected, *C. tenuicollis* was detected in 107 (35.7%) and 116 (38.7%) male and female sheep, respectively. *C. tenuicollis* was found more in adult male sheep 66 (44%) than in young male sheep 41 (27.3%) with a significant statistical difference in infection rates between the two age groups (P <0.05). The prevalence of *C. tenuicollis* was higher in adult females 70 (46.7%) than in young female sheep 46 (30.7%) with a significant statistical difference in prevalence (P <0.05). The prevalence of *C. tenuicollis* was higher in adult female goats 68 (45.3%) than in adult male goats 64 (42.7) (Table 2).

Table 3 indicates the infection rate of *C. tenuicollis* in different organ of sheep and goats. The cysts in sheep and goats had a tendency to be located more in the omentum, and it was lower in other organs. The infection rate in goats and sheep were comparable. Out of a total of 471 cysts counted in different internal organs of sheep and goats, 322 (68.3%), 39 (8.28%), 91 (19.32%), 14 (2.98%) and 3(0.63%), 1(0.2%), and 1(0.3%) were found in the omentum, mesentery, livers, lungs, diaphragm, uterus, and rectum, respectively. More cysts were found in each of the above visceral organs of goats than in the same organs of sheep (Table 3).

Table 4 indicates the percentage of *C. tenuicollis* in the visceral organs of young and adult sheep. The percentage was higher in the omentum of adult sheep 124 (41.3%) than in the omentum of young sheep 81 (27.0%). Likewise, the infection rate was higher in the liver of adult sheep 32 (10.7%) than the young sheep 15 (5%) with a Significant statistical difference (P < 0.05). The number of cysts counted in the omentum, mesentery, liver, lung, diaphragm, and uterus was higher in adult sheep than in young sheep (Table 4).

Table 5 shows that variation between infection rates in different organs of the two species. The infection rate was higher in the omentum 117 (39%), mesentery 17 (5.7%), liver 44 (5.7%) of goats than in the sheep in the same organs with a Significant statistical difference (P< 0.05). There was Significant statistical difference between the numbers of cysts found in the omentum, liver, and lung of goats and sheep. There was no significant difference between the number of cysts counted in the mesentery, diaphragm, uterus and rectum of goats and sheep (Table 5).

Table 6 shows the variation in infection rates between different organs in relation to the sex of animals. There was no significant difference in the infection rates between male and female goats in all of the examined organs. But significant difference in infection rate in the omentum of male and female sheep was noted (Table 6).

Table 2. Prevalence of *Cysticercus tenuicollis* in sheep and goats based on their sex and age slaughtered at Addis Ababa abattoir, Ethiopia during November 2008 -March 2009.

Species (N)	Sex (N)	Age (N)	Prevalence N (%)	P-Value
Sheep (600)	Male (300)	Young (150)	41(27.3)	0.003
		Adult (150)	66 (44)	
		Total =300	107(35.7)	
	Female (300)	Young (150)	46 (30.7)	0.002
		Adult (150)	70 (46.7)	
		Total =300	116 (38.7)	
Goats (300)	Male (150)	Adult (150)	64 (42.7)	0.078
	Female (150)	Adult (150)	68 (45.3)	
		Total=300	132 (44)	

N: - Number of animals

Table 3. Infection rates of different visceral organs with *Cysticercus tenuicollis* in sheep and goats slaughtered at Addis Ababa abattoir, Ethiopia during November 2008 -March 2009

	Inspected visceral organs						
Species	**Omentem**	**Mesentery**	**Liver**	**Lung**	**Diaphragm**	**Uterus**	**Rectum**
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
Goats	117 (39.0)	17 (5.7)	44 (14.7)	9(3.0)	2(0.7)	0(0)	1(0.3)
Sheep	205 (34.2)	22(3.7)	47 (7.8)	5(0.8)	1(0.2)	1(0.2)	0(0)
Total	322(68.36)	39(8.28)	91(19.32)	14(2.98)	3(0.6)	1(0.2)	1(0.3)

No: Number of infected animal's organ.

Table 4. Percentage of *Cysticercus tenuicollis* in the visceral organs of young and adult sheep slaughtered at Addis Ababa abattoir, Ethiopia during November 2008 -March 2009

	Inspected visceral organs					
	Omentum	Mesentery	Liver	Lung	Diaphragm	Uterus
Age	Positive =N (%)	Positive =N (%)	Positive =N (%)	Positive =N (%)	Positive =N (%)	Positive =N (%)
Young	81(27.0)	10(3.3)	15(5)	2(0.7)	0(0)	0(0)
Adult	124(41.3)	12(4.0)	32(10.7)	3(1)	1(0.3)	1(0.3)

N: Number of animals

To cite this paper: Bejiga T, Haile A, Solomon T, Sefir D and Pal M. 2016. Prevalence of *Cysticercus Tenuicollis* in Small Ruminants Slaughtered at Addis Ababa Abattoir, Ethiopia. *World Vet. J.* 6(3): 137-142.
Journal homepage: www.wvj.science-line.com

Table 5. Variation between infections rates of specific organs in sheep and goats slaughtered at Addis Ababa abattoir, Ethiopia. November 2008 -March 2009.

Visceral organ	Goats (300)	Sheep (600)	P-value
	Positive = N(%)	Positive = N(%)	
Omentum	117(39)	205(34.2)	0.021
Mesentery	17(5.7)	22(3.7)	0.52
Liver	44(14.7)	47(7.8)	0.001
Lung	9(3)	5)0.8)	0.013
diaphragm	2(0.7)	1(0.2)	0.222
Uterus	-	1(0.2)	0.667
Rectum	1(0.3)	-	0.333

N: Number of infected animals.

Table 6. Variation between infection rates of specific organs in relation to sex of the animals (sheep and goats) slaughtered at Addis Ababa abattoir, Ethiopia during November 2008 -March 2009.

Visceral organ	Sex	Goats (300)	P-value	Sheep (600)	P-value
		Positive =N (%)		Positive =N(%)	
Omentum	Male	56(37.3)	0.079	97(32.3)	0.044
	Female	61(40.7)		108(36)	
Mesentry	Male	8(5.3)	0.191	8(2.7)	0.075
	Female	9(6.0)		14(4.7)	
Liver	Male	21(14.0)	0.123	23(7.7)	0.119
	Female	23(15.3)		24(8.0)	
Lung	Male	5(3.3)	0.249	1(0.3)	0.156
	Female	2(2.7)		4(1.3)	
Diaphragm	Male	2(1.3)	0.249	1(0.3)	0.5
	Female	-		-	
Uterus	Male	---	----	-	0.5
	Female	---		1(0.3)	
Rectum	Male	-	0.5	----	----
	Female	1(0.3)		----	

N: Number of infected animals.

DISCUSSION

During the study period, a total of 900 shoats were examined from November 2008- March 2009 to determine the prevalence rate and to assess the infection rates of different visceral organs with of *C. tenuicollis*. The prevalence of 37.2% and 44% was found in sheep and goats, respectively. The prevalence of *C. tenuicollis* by species was higher in goats when compared with that of sheep and this difference was found to be statistically significant. Similar observation was made by Samuel (2008) and Abdulikadir et al. (2015) who found out that goats were more infected with *C. tenuicollis* than sheep and also in According to Torgersan et, al. (1998) under condition of high infestation with C. *tenuicollis*, most sheep develop protective immunity early in life and the density dependent constrains regulates the parasite population, whereas goats develop the immunity more slowly. This considerable degree of immunity against *C. tenuicollis* infection in sheep may be the reason for the low prevalence of the parasite in sheep. High prevalence was reported in East Ethiopia by Sisay et al. (2007). The overall prevalence was higher in sheep (79%) than in goats (53%) with a significant statistical difference.

The prevalence of *C. tenuicollis* in sheep and goats in our study was relatively lower when compared with the results attained by Samuel (2008) and Abdulikadir et al. (2015) who recorded the prevalence of 40% and 45% in sheep and 46.6% and 53.9% in goats in central Ethiopia and in Bishoftu, Elfora Export Abattoir, Ethiopia respectively. But this finding is compared to the report of Endale et al. (2013) the prevalence of *C. tenuicollis* in sheep and goats in this study is relatively higher. Different investigators have also reported from other part of the world on the prevalence of *C. tenuicollis.* The prevalence of 37.03% and 27.29% have been reported in sheep and in goats, respectively in India (Pathak and Gaur, 1982) and in Nigeria, a prevalence of 21.4% in sheep and 34.2% in goats have been reported by Dada and Bellino (1978). In Germany, Hasslinger and Weber-Werrinhen (1988) recorded a prevalence of 16.7% in sheep. The prevalence of 21.4% in sheep and 34.2% in goats was reported in Iran (Solaymani-Mohammadi et al., 2003), and also similar results were obtained in Iran by Radfar et al. (2005) who described a prevalence of 12.84% in sheep and 18.04%

To cite this paper: Bejiga T, Haile A, Solomon T, Sefir D and Pal M. 2016. Prevalence of *Cysticercus Tenuicollis* in Small Ruminants Slaughtered at Addis Ababa Abattoir, Ethiopia. *World Vet. J.* 6(3): 137-142.
Journal homepage: www.wvj.science-line.com

in goats. Relatively lower prevalences were recorded in other countries and this may be due to the variation in temperature, environmental condition, the degree of pasture contamination and the way of raising and grazing of these animals which may favor the transmission cycle between ruminants and dogs and other wild canines. (Samuel, 2008)

C. tenuicollis was encountered 35.7% in 300 male sheep, whereas the prevalence in female sheep was 38.7%. The prevalence of *C. tenuicollis* was found to be 42.7% in male and 45.3% in female goats. In this study, the animals were categorized in two age groups (young and adult). Out of 300 slaughtered and examined young sheep, *C. tenuicollis* was detected in 28.3% of them, whereas the prevalence in adult sheep was 46% indicating high infection rate in adult sheep with a statistical difference ($P < 0.05$). Similar results were obtained in Bishoftu Elfora Export Abattoir, Ethiopia. by Abdulikadir et al., (2015) who described a prevalence of 34.1% in adult sheep and 15.3% in young sheep with a statistical difference. The difference in infection rates between young and adult sheep may be due to the fact that adult sheep lived longer and consumed larger number of eggs during grazing when compared with young sheep which had only lived for a shorter period of time. Comparison of infection rates between young and adult goats could not be made, while no young goats were delivered to the Addis Ababa Abattoir during the study period.

The current study indicated that different visceral organs and other organs can be infected with *C. tenuicollis* at different infection rates. In this study the predominant predilection site of *C. tenuicollis* was found to be the omentum. A similar observation was made by El-Azazy and Fayek (1990).The percentage of infection was higher in the omentum of goats (39%) than in the omentum of sheep (34.2%). This difference in the infection rate of *C. tenuicollis* in the omentum of goats and sheep was statistically significant ($P <0.05$). Similar observations were made by Radfar et al. (2005) and Samuel (2008). The infection rate of *C. tenuicollis* was higher in the omentum of adult sheep (41.3%) than the young ones (27.0%), and the infection rate of *C. tenuicollis* in the liver of adult sheep was higher (10.7%) than the young sheep (5%) with a statistically significant difference ($P<0.05$). The higher prevalence of *C. tenuicollis* in the slaughtered animals also indicated that the cyst causes considerable economic loss, due to condemnation of the affected organs at the slaughter house. Such losses are of particular importance for Ethiopia, which has low economic output where sheep and goat production are the major livestock industries.

CONCLUSION

In conclusion, *C.tenucollis* is prevalent in Ethiopia, in shoats, whereby goats are more infected than sheep and also the adult animals are more infected than young ones. The cyst invades most of the visceral organs, with higher frequency of being detected in the omentum, mesentery, and liver. Particularly, infection of the liver leads to condemnation of the organ which results in scarcity of edible offal and severe economic losses. Therefore, extensively studied both in the final and intermediate hosts, and appropriate control measures should be put in place to reduce the prevalence of the disease in sheep and goats at all level.

Competing interests

The authors have declared that there are no competing interests exist.

REFERENCES

AACA (2004). Addis Ababa city Administration for establishment of Sub-city and kebele Addis Ababa , Ethiopia. http://www.addisababacity.gov.et/.

Abebe G (1995). Current status of veterinary education and animal health research in Ethiopia. In Veterinary Medicine Impact on Human Health and Nutrition in Africa. Proceeding of an International Conference at ILRI, Addis Ababa.Pp.133-138.

Abdulkadir A, Assefa K and Bedaso M (2015). Prevalence, Cyst Distribution in Visceral Organs and Economic Loss of Cysticercus tenuicollis in Small Ruminants Slaughtered at Bishoftu, Elfora Export Abattoir. American-Eurasian Journal of Scientific Research, 10: 210-220.

Abidi SMA, WA Nazami, PK WAN, M Ahmad and M Irshadulah (1989). Biochemical characterization of *Taenia hydatigena* cysticeri from goats and pigs. Journal of Helminthology**,** 63: 333-337.

Assefa M (2005). Parasitic causes of carcass or organ condemnation at Assela municipality abattoir. DVM Thesis. Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.

Dada BJ and ED Belino (1978). Prevalence of hydatidosis and cysticercosis in slaughtered livestock in Nigeria. Veterinary Record, 103: 311-312.

Devendra C and G Meclorey (1990). Goat and sheep production in tropics. Long Mont, Singapore, pp. 1-5.

EL-Azay OM and SA Fayek (1990). Seasonal pattern of *Fasciola gigantica* and *Cysticercus tenuicollis* infections in sheep and goats in Egypt. Bulletin of Animal health and Production in Africa. 38: 369-373.

Endale M, Shihun S, Jemere B and Desie S (2013). Sheep and goats Cysticercus tenuicollis prevalence and associated risk factors. African Journal of Agricultural Research, pp. 3121-3125.

Gatenby RM (1991). Sheep: the Tropical Agriculturalist. MACMILLIAN education Ltd. ACCT., London and Basingstoke, pp. 6 -10.

Hadush A and Pal M (2016). Ascariasis: Public health implications and its status in Ethiopia. Air and Water Borne Diseases, 5: 124

Hasslinger MA and R Weber-Werringen (1988). Fecal survey in pastured sheep and the occurrence of *Cysticercus tenuicollis* in slaughtered sheep. Angewandte Parasitologie, 9: 227-234.

Ibrahim H (1998). Small Ruminant Production Techniques. International Laboratory for Research on Animal Disease, Manual No 3 International Livestock Research Institute Nairobi, Kenya, pp. 1–36.

ILCA (1993). Annual report and program highlights. International Livestock Center for Africa, Addis Ababa, Ethiopia.

Jorgan H and Brian P (1994). The Epidemiology, Diagnosis and Control of Helminth Parasites of Ruminants. International Laboratory for Research on Animal Disease, Nairobi, Kenya. www.fao.org/Wairdocs/ILRI/x5492E/x5492E00.htm

Kebede W, Pal M, Deressa A and Ritwick R (2013). Prevalence and economic significance of fasciolosis in cattle slaughtered at Elfora abattoir, Gondar, Ethiopia. Journal of Natural History, 9: 22-29.

Nasr W and Pal M (2016). Prevalence, cysts viability, fertility and economic significance of bovine hydatidosis in an abattoir at Kombolcha, Ethiopia. Haryana Veterinarian, 55: 17-22.

Pal M (2007). Zoonoses. 2nd edition. Satyam Publishers, Jaipur, India, pp. 1-362.

Pal M, Abdurahman M and Zewdu M (2014).Grwoing significance of fascioliasis as an emerging zoonosis. Ethiopian International Journal of Multidisciplinary Research. 1: 10-13.

Pathak KM and SN Gaur (1982). The incidence of adult and larval stage of *Taenia hydatigena* in Uttar Pradesh (India). Veterinary Parasitology, 10: 91-95.

Radfar MH, Jajalli S and Jalazadeh M (2005). Prevalence and morphological characterization of *C. tenuicollis* (*T. hydatuigena cysticercii*) from sheep and goats in Iran. Veterinarski arhiv, 75: 469-476.

Samuel W (2008). Cross sectional study on the prevalence of *Cysticercus tenuicollis* in visceral organs of sheep and goats slaughtered at Helmix export abattoir in Debre Zeit. DVM Thesis. Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.

Schillorn Van VTW (1985). General aspect of small ruminant health. Management, Technology and Extension, IN Wilson RT and Boerzat D (eds.) Small ruminants in Africa Agriculture . International Livestock Center for Africa: Addis Ababa, Ethiopia, pp. 94–106.

Steel M (1996). Goats: The tropical Agriculturalist. MACMILLAN Education Ltd, ACCT, London and Basingstoke. pp. 79 – 83.

Sissay M M, Uggla A and Waller PJ (2007). Prevalence and seasonal incidence of nematode parasites and fluke infections of sheep goats in eastern Ethiopia. Tropical Animal Health Prod, 39: 521-531.

Solaymani-Mohammadi S, Mobedi I, Rezaian M, Massoud J, Mohebali M, Hooshyar H, Ashrafi K and Rokni MB (2003). Helminth parasites of the wild boar, Sus scrofa, in Luristan Province, Western Iran and their public health significance. Journal of Helminthology, 77: 263-267.

Soulsby EJL (1989). Helminthes, Arthropods and Protozoa of domesticated animals. 8th edition, Bailliere Tindall, London, pp. 562–563.

Torgerson P, Williams D and Abo-Shehada M (1998). Modelling the prevalence of *Echinococcus* and *Taenia* species in small ruminants of different ages in Northern Jordan. Veterinary Parasitology, 79: 35-51.

Yehualashet BA, Aklilu ZK and Tsegaye A (2012). Prevalence and economic importance of liver parasites: Hydatid cyst, Fasciola species and cysticercus tenuicollis in sheep and goats slaughtered at Addis Ababa abattoir enterprise in Ethiopia. Journal of veterinary medicine and animal health, 5: 1-7.

Yimam M (2003). Major causes of organ condemnation in ruminants slaughtered at Gonder abattoir, North-western Ethiopia.DVM Thesis. Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.

To cite this paper: Bejiga T, Haile A, Solomon T, Sefir D and Pal M. 2016. Prevalence of *Cysticercus Tenuicollis* in Small Ruminants Slaughtered at Addis Ababa Abattoir, Ethiopia. *World Vet. J.* 6(3): 137-142.
Journal homepage: www.wvj.science-line.com