

## Prevalence of Equine Fasciolosis in and Around Sebeta, Finifine Especial Zone of Oromiya Regional State, Ethiopia

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**Abstract:** A cross sectional study was conducted from October 2014 to May 2015 to determine the prevalence of fasciolosis in equine species in and around Sebeta. A total of 384 animals were randomly selected. Fecal samples were collected from these animals for qualitative fecal analysis. These were; 327 donkeys, 47 horses and 10 mules. Of all fecal samples, 29 (7.6%) were positive for fasciolosis. Statistically, there was no significant difference ( $P>0.05$ ) in the prevalence of fasciolosis among species, sexes and age groups of the three equine species. Significant difference ( $P<0.05$ ) was observed in prevalence of the disease between animals with different body conditions. The result of this study indicated that fasciolosis is becoming an important health problem seeking strategic prevention and control measures in the study area.

**Key words:** Equine • Ethiopia • Fasciolosis • Prevalence • Sebeta

### INTRODUCTION

More recent estimates have shown that Ethiopia possesses about 9 million equine population [1, 2] Horses, donkeys and mules belong to the group, which has approximately 6.21 million donkeys, which is 32% of Africa's and 10% of the world's donkey population and 2 million horses which is 33.5% of Africa population [3, 4]. The large number of equine is found in the central high lands of the country like Sebeta, where about 12, 337 equine populations are found [1] and enjoy diverse topographic and climatic conditions favorable for them.

Equines are also important animals to the resource-poor communities in both rural and urban low cost and in the remote areas of the country, park animals offer the only realistic way of obtaining returns from agriculture above mere existence [5, 6]. In the farming system, equines play a vital role in both economic as well as social functions. This is due to the low level of development of the road transport network and the rough terrain of the country [7]. They are kept and often used mainly for tillage, cultivation, threshing, packing and, riding purposes. They are also used for social security, prestige and providing of manure for both energy and soil fertility [8].

Although they are large in number and have great contributions to national economy, certain impediments hinder the maximum utilization of these animals to their potential. Some of these are the abundantly occurring infectious and parasitic diseases and the poor management system to these animals in the country [9]. Parasitic diseases have an economic impact on equines as they cause loss through lowered fertility, reduced work capacity and increased treatment cost [10, 11]; causing pain in affected animals [12] and being a major health hazard, limiting the overall performance of equines [13].

Among the helminthes, strongyles (large and small strongyles), *Trichostrongylus axei*, *Triodontophorus* species, *Trichonema* species, *Parascaris equorum*, *Anoplocephala* species, *Dictyocaulus arnfieldi* and *Fasciola* species are the most known devastating parasites of equines [14]. Economically, fasciolosis cause an important parasitic disease. Though *Fasciola* species is quite common in many species of mammals, information on its occurrence in equines is scanty [15]. But equines are as suitable as cattle for liver fluke hosts [16]. The two species most commonly implicated, as the etiological agent of fasciolosis with serious economic importance are *Fasciola hepatica* and *Fasciola gigantica*. *Fasciola hepatica* has a worldwide distribution but predominates

in temperate zones while *Fasciola gigantica* is found in most continents primarily in tropical regions [17, 18]. There is paucity of information in the distribution and predisposing factors of equine fasciolosis in and around Sebeta. Therefore, the main objectives of this study were to determine the prevalence, assess the intensity of the disease and predisposing factors of equine fasciolosis in the study area.

## MATERIALS AND METHODS

**Study Area:** This study was conducted from October 2014 to May 2015 in and around Sebeta town, which is a capital town of Sebeta Hawas district of Finfine Especial Zone of Oromiya Regional State. This area has a mid sub-tropical weather 'WeynaDeg' and highland temperature type climate 'Dega'. The mean annual temperature and rainfall ranges between 15°C to 21°C and 800 mm to 1199 mm, respectively and it is located 25 km west of Addis Ababa. The altitude of area ranges from 1500-3000 m.a.s.l and the total coverage of the area is 103, 758 km<sup>2</sup>. The major types of soil in the area supporting the crops and the flora of the area are 60% black, 33% red, 5% brown and 2% gray as the agricultural activities are mainly mixed type with cattle rearing and crop production under taken side by side [19].

**Study Population:** The study animals were equine species; donkeys, horses and mules. All equines were randomly selected by scoring their body condition, sex and age. The age of the animals were determined by dentition and the sampled equines were grouped into two age categories; as young those under two years and adult those above two years old [20]. The body condition of each animals was judged by visual inspection and evaluated as 'poor', 'moderate' and 'good' based on the body condition scoring techniques on Guide of Svendsen [21]. Poor: Emaciated; ribs, spines and tuber coxae are very prominent. Medium: palpable spinous processes; but not prominent, skin and coat are generally in good condition. Good: Spine processes are not easily palpable, well-muscled, shiny coat, intact skin overcoat.

**Study Design:** A cross section study was employed and a simple random sampling technique was followed to select households owned equines and individual animals.

**Sample Size:** The total sample size required for this study was determined based on Thrusfield [22] description using an expected prevalence of 50% since there was no

previous study conducted in the area; with 95% confidence interval and 5% precision. Therefore, a total of 384 equines were sampled to determine the prevalence and risk factors of fasciolosis in the area. Among which 327 were donkeys, 47 were horses and 10 were mules.

**Study Methodology:** The fecal specimens were collected directly from the rectum of each animals or from freshly voided feces using disposable plastic gloves and placed in clean screw capped universal bottle and labeled appropriately with animal identification (sex, age, body condition score (BSC), equine species and owner's name) and kept in icebox and immediately transported to parasitological laboratory of Nationa Animal Health Diagnostic Investigation Center (NAHDIC). In the laboratory, coprological examination was performed to detect the presence of Fasciola Eggs using standard sedimentation technique. To differentiate between eggs of *Paramphistomum* species and *Fasciola* species a drop of methylene blue solution was added to the sediment so that eggs of *Fasciola* species show yellowish color while eggs of *Paramphistomum* species take stain color of methylene blue [17, 18, 23].

**Data Management and Analysis:** Data collected from the study animals were coded and entered in to a Microsoft Excel sheet data base system used for data management. All statistical analyses were performed using SPSS windows version 20.0 was used for data analysis. Descriptive statistics, percentages and 95% confidence interval were used to summarize the proportion of infected and non infected animals. Statistical significance was set as  $P < 0.05$ .

## RESULTS

Among 384 animals examined 29 (7.6%) of equines were detected to be positive for fasciolosis. Of this donkeys, horses and mules contributes 26(89.7%), 2(6.9%) and 1(3.4%) respectively (Table 1). There was no statistically significant difference in level of infection among the three equine species ( $P < 0.05$ ). This implies that admittedly, species in equine has no effect on the prevalence of fasciolosis and all species are equally susceptible to the disease.

For the occurrence of fasciolosis in this study sex, age, body condition and intermediate host (snail) were considered as risk factors. The prevalence of equine fasciolosis among different age groups, sexes and body condition scores are indicated in Tables 2-4 below.

Table 1: Prevalence of fasciolosis among equine species

Species	Total examined	Number of positive	Prevalence (%)
Donkey	327	26	8
Horse	47	2	4.3
Mule	10	1	10
Total	384	29	7.6

P=0.640

Table 2: Prevalence of fasciolosis among age groups

Age	Total examined	Number of positive	Prevalence (%)
Young	70	6	7.9
Adult	308	23	7.5
Total	384	29	7.6

P=0.900

Table 3: Prevalence of fasciolosis among sexes

Sex	Total examined	Number of positive	Prevalence (%)
Female	231	18	7.8
Male	153	11	7.2
Total	384	29	7.6

P=0.827

Table 4: Prevalence of fasciolosis depending on body condition

Body condition score	Total examined	Number of positive	Prevalence (%)
Poor	51	24	47.1
Medium	143	5	3.5
Good	190	0	0
Total	384	29	7.6

P<0.001

Prevalence of fasciolosis in young and adult animals was 7.9% and 7.5 % respectively. However, statistically no significant difference ( $P \geq 0.05$ ) was observed between age groups (Table 2).

There was also no statistically significant difference ( $P > 0.05$ ) in prevalence of the disease between sexes. Prevalence of fasciolosis in female and male equines was 7.8% and 7.2%, respectively (Table 3).

Statistically, significant difference was observed ( $P < 0.05$ ) in prevalence of fasciolosis between equines with different body condition scores (Table 4).

## DISCUSSION

This study was conducted to determine the prevalence of equine fasciolosis and about 7.6% of the disease was recorded in the study area. This is comparable to other reports in Managasha (9%) by Yilma *et al.* [24], in South Wollo zone of Amhara Regional State (12.2%) by Seid [25], (12.6%) in Asella and (17.5%) in Bale Goba Yacob and Hagos [26], (17.2%) in Bahar Dar by Bewketu and Endalkalchew [11] and reports (37.9%) in

Dodolaby Yacob and Hagos [26], in the central highlands of Ethiopia by Yosef *et al.* [27] and Mulate [28]. This higher prevalence of the disease in the study area might be due to the presence of conducive ecological factors for multiplication of the intermediate host (snail) and the parasite. The area was swampy and marshy area which is suitable for the intermediate host to continue the life cycle [17]. Hammami and Ayadi [29] have reported that permanent dampness, suitable luminosity basic  $P^H$  of soil and water and temperature contribute to multiplicity of snails. This study indicated that fasciolosis is becoming a quite important health problem which is increasing from time to time. A study conducted by Hardy *et al.* [30] in Egypt indicated that donkeys are the potential reservoir of fasciolosis and they recommended that donkeys should be considered within the preventive and control measures of fasciolosis.

Prevalence of the disease in this study was not in agreement with the previous reports by Ayele *et al.* [13] which is 1.5% in Dugda Bora, by Alemayehu and Etaferahu [9] which is 5.9% in South Wollo, by Yacob [2] which is 2.5 in Tiyo, by Getachew *et al.* [31] which is 5.7%. This might be due to the differences in temperature, moisture, humidity and soil that might favor multiplication of intermediate host, snails and the parasite. The area is lodged, swampy and marshy area which is suitable for the intermediate host, snails to continue the life cycle [17]. The area is water lodged, swampy and marshy area which is suitable for the intermediate host, snails to continue the life cycle [17].

In this study there was no statistically significant difference ( $P < 0.05$ ) in prevalence of fasciolosis among the three equine species; donkeys (8.0%), horses (4.3%) and mules (10%). This is in agreement with Seid [25] who reported that admittedly, species in equine has no effect on the prevalence of fasciolosis and all species are equally susceptible to the disease.

The prevalence of the disease in female and male animals was reported as 7.8% and 7.2% respectively. There was no significant difference ( $P > 0.05$ ) between the two sexes indicating that sex seems no effect on the prevalence of the disease. This might be due to the fact that grazing of both sex groups in similar pasture land so that they have equal chance to be infected. Moreover, it might also be that fasciolosis is not a disease directly related to animal reproductive system. Similar results have been reported by Seid [25].

There was also no significant difference in the prevalence of the disease among age groups. This indicates that age has no any significant on the

prevalence of equine fasciolosis and hence both age groups are equally susceptible to disease. This might be due to the fact that in equines young animals graze on the same pasture land together with adult animals. Of course, biologically the pathogenicity of the disease could be severe in young animals as compared to adults.

Prevalence of fasciolosis on the basis of body condition to the study the impact of the disease in emaciated infected animals. The results of the study indicated that the rate of the infection in poor body condition animals was significantly higher ( $P < 0.05$ ) than that of animals with good body condition. This indicates the importance of fasciolosis in causing weight loss and is a characteristics sign of the disease. This is also reported by different authors [17]. Hence body condition is a good indicator of parasitic infection, which can be used by the resource limited communities to identify donkeys with immediate requirement of Anthelmintic, remedies [13].

### CONCLUSION

Fasciolosis has been and is still one of the major constraints to live stock development in Ethiopia by inflicting remarkable direct and indirect losses in various parts of the country were suitable biotopes for the development and breeding of snail intermediate host prevail. The prevalence of fasciolosis is higher in the study area as compared to other reports in different parts of the country. Among predisposing factors the presence of conducive environmental condition for development of snail is the major one. Based on the above conclusive remarks, the following recommendations are forwarded: Further epidemiological studies should be conducted on seasonal dynamics of the parasite and its intermediate host; Proper attention should be paid to this parasitic problem and control strategies should be devised at least to reduce the infection rate to economically tolerable level; Strategic anthelmintic treatment should be practices in the area and government and non-governmental organizations should include equines in their priority lists of research and develop integrated disease prevention and control.

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### REFERENCES

1. CSA, 2013. Central statistical agency of Ethiopia: 2012/13 agricultural sample survey vol. II: report on livestock and livestock characteristics.
2. Yacob, H.T., 2016. Gastro-Intestinal Parasites of Equines in Tiyo District of Oromia Region, Ethiopia. Addis Ababa University, College of Veterinary Medicine and Agriculture Department of Pathology and Parasitology, *Journal of Global Veterinaria*, 17(2): 154-160.
3. Kidanmariam, G., 2000. The use of donkeys for transport in Amhara Region, Ethiopia. In *Donkeys People and Development*, 77(2): 159.
4. Mearg, F. and K.M. Ahmed, 2015. A Review on Population Dynamic Production Statistics of Horse and Ass in Ethiopia. *Journal of Biology, Agriculture and Healthcare*, 5(1): 57-62.
5. Kumar, N., K.K. Fisseha, N. Shishay and Y. Hagos, 2014. Welfare Assessment of Working Donkeys in Mekelle City, Ethiopia. *Journal of Global Veterinaria*, 12(3): 314-319.
6. Biffa, D. and M. Woldemeskel, 2006. Causes and Factors Associated With Occurrence of External Injuries in Working Equines in Ethiopia. *Inter. J. App. Res. Vet. Med.*, 4: 1-7.
7. Gebrewold, A., A. Tegegn and A. Yami, 2004. Research needs of donkey utilization in Ethiopia. In: Fielding and Starky P (eds). *Donkeys, people Development. A resource book of the animal traction network for eastern and southern Africa (ATNESA)*, Technical center for agricultural and rural cooperation (CTA), Wagenigen, The Netherlands, pp: 77-81, ISBN 92-9081-219-2.
8. Wilson, R.T., 1991. Equines in Ethiopia. In fielding, person RA (editors). *Donkey, Mules and Horses in tropical Agricultural development*. Edingburgh, Scotland, pp: 33-47, Center for tropical Veterinary Medicine, University of Edinburgh.
9. Alemayehu, R. and Y. Etaferahu, 2013. Gastrointestinal Parasites of Equine in South Wollo Zone, North Eastern Ethiopia. *Journal of Global Veterinaria*, 11(6): 824-830.
10. Krecek, R., R. Reinecke and I. Horak, 1989. Internal parasites of horses on mixed Grassveld and Bushveld in Transvaal, Republic of South Africa. *Vet. Parasitol.*, 34: 135-145.
11. Bewketu, T. and N. Endalkachew, 2013. Prevalence of gastrointestinal helminthes of donkeys and mules in and around Bahir Dar, Ethiopia. *Ethiop. Vet. J.*, 17(1): 13-30.

12. Regassa, F., D. Reta and B. Mideksa, 2005. Prevalence of equines gastrointestinal parasites in western highlands of Oromia, Ethiopia. Bull. Anim. Hlth. Prod. Afr., 53: 161-166.
13. Ayele, G., G. Fiseha, E. Bojia and A. Joe, 2006. Prevalence of gastro-intestinal parasites of donkeys in Dugda Bora District, Ethiopia. Livestock Research for Rural Development, 18: 5-7.
14. Pandit, B.A., R.A. Shahardarand, L. Jalabal, 2008. Prevalence of GI parasitic infections in equines of Kashmir Valley. Vet Scan, 3: 1-4.
15. Esteban, J., C. Gonzalaz, F. Curtalc, C. Munoz- Antoli, M.A. Valero, M.D. Bargues, M. El-Sayed, D. Engels, L. Savioli and S. Mascoma, 2003. Hyper endemic Fascioliasis associated with Schistosomiasis in village in the Nile Della of Egypt. American Journal of Tropical Medicine and Hygiene, 69(4): 429-437.
16. Akahane, H., Y. Harada and T. Oshima, 1970. "Patterns of the Variation of the Common Liver Fluke (*Fasciola* sp.) in Japan. III. Comparative Studies on the External Form, Size of Egg and Number of Eggs in the Uterus of Fluke in Cattle, Goat and Rabbit" Japanese Journal of Parasitology, 19: 619-627.
17. Urquhart, G.M., J. Armour, J.L. Duncan, A.M. Dunn and F.W. Jennings, 1996. Veterinary parasitology, 2<sup>nd</sup> edition: Black well science Ltd, pp: 231.
18. Soulsby, E., 1982. Helminthes, Arthropods and protozoa of Domestic Animals, 7<sup>th</sup> edition, pp: 790. Balliere Tindall, 1<sup>st</sup> Annes Road, East bourne, East Sussex BN21.
19. SHLFRO, 2014. SebetaHawasLivestoke and Fishery ResourcOffice, Sebeta, Ethiopia.
20. Pearson, R.A. and M. Ouassat, 2000. A guide to live weight estimation and body condition scoring of donkeys. (CTVM, Edinburgh).
21. Svendsen, E.D., 1997. Parasites abroad. The professional hand book donkey, 3<sup>rd</sup> edition, pp: 166-182, Whittet Books Limited 18 Anley Road, London W14 0BY, pp: 166.
22. Thrusfield, M., 1995. Veterinary epidemiology. 2<sup>nd</sup> edition, UK, Black Well Science Ltd., pp: 182-189.
23. Hansen, J. and B. Perry, 1994. The epidemiology, Diagnosis and Control of Helminthic parasites of Ruminants, A hand book, printed by the international Livestock center for Africa, Addis Ababa, Ethiopia.
24. Yilma, J., F. Gebreab, E.D. Svendsen and M. Abdela, 1990. Health problems of working donkeys in DebreZeit and Menagesha regions of Ethiopia: paper presented at international colloquium on Donkeys, Mules and Horses in tropical Agricultural Development, Health in Edinburgh, Scotland, 3<sup>rd</sup> -6<sup>th</sup> September.
25. Seid, A., 2007. Study on the prevalence of equine fasciolosis in South Wollo Zone of Amhara regional State, pp: 6-8. A thesis submitted to Faculty of Veterinary Medicine, Addis Ababa University.
26. Yacob, H.T. and A. Hagos, 2013. Epidemiological study on Gastrointestinal Helminthsof horses in Arsi-Bale highlands of Oromiya Region, Ethiopia. Ethiop. Vet. J., 17(2): 51-62, <http://dx.doi.org/10.4314/evj.v17i2.4>.
27. Yoseph, S., F. Gebreab and A. Wesene, 2001. Survey on helminthosis of equine in Wonchi, Ethiopia. Journal of the Ethiopian Veterinary Association, 5: 47-61.
28. Mulate, B., 2005. Preliminary study on helminthosis of Equines in south and north wollo zones. Journal of Ethiopia Veterinary Association, 9: 25-37.
29. Hammami, H. and A. Ayadi, 1999. Ecology of *Lymnaea truncatula* Muller, intermediate host of *Fasciola hepatica* Linne in the microclimate of Tozeur (South east of Tunisia). Bulletin De La Societe De Pathologie Exotique, 92(5): 302-304.
30. Hardy, F.M., T.A. Morsy, N.I. Gawish, T.N. Antonios and A.G.M. Abdel Gaward, 2002. The potential reservoir host role of donkeys and horses in zoonotic fasciolosis in Gharbia Government, Egypt. Egyptian Society of Parasitology, 32: 561-570
31. Getachew, M., A.F. Trawford, G. Feseha and S.W.J. Reid, 2010. "Gastrointestinal Parasites of Working Donkeys in Ethiopia," Tropical Animal Health and Production, 42(1): 27-33. <http://dx.doi.org/10.1007/s11250-009-9381-0>.