

Study on Clinical Bovine Dermatophilosis and its Potential Risk Factors in North Western Ethiopia

¹Meseret Admassu and ²Sefinew Alemu

¹Bahir Dar Regional Veterinary Laboratory, Bahir Dar, Ethiopia

²Department of Clinical Studies, Faculty of Veterinary Medicine, University of Gondar,
P.O. Box 196, Gondar Ethiopia

Abstract: A cross-sectional study of dermatophilosis was undertaken from October 2008 to March 2009 on 3456 cattle (3181 indigenous zebu and 275 Holestien-zebu cross) with the aim of determining prevalence and associated risk factors in urban and periurban areas of Bahir Dar, north western Ethiopia. Culturing of *Dermatophilus congolensis* and Giemsa staining were the techniques used. Thirty six of 3456 examined animals (1.04%) had clinical dermatophilosis. Prevalence was higher in cross bred (5.5%) than in indigenous zebu (0.7%) cattle, in male cattle (1.7%) than in female (0.8%), in adults (1.2%) than in young (0.8%) age groups, in wet (1.6%) than in dry season (0.5%), and in cattle infested with tick (2.7%) than cattle with no tick infestation (0.4%). Statistically significant difference ($p \leq 0.05$) was observed in the prevalence between breeds of cattle, between age groups, between wet and dry seasons, and between cattle with and without tick infestation. *Amblyoma variegatum* was identified. The study indicated dermatophilosis is a potential determinant factor for the dairy development strategy started through cross breeding in the study area. Tick control especially on crossbred cattle is suggested to reduce the risk of dermatophilosis.

Key words: Holestien, giemsa, prevalence, tick, zebu

INTRODUCTION

Dermatophilosis is a chronic or acute exudative dermatitis caused by the bacterium *Dermatophilus congolensis*. The disease affects a wide variety of animals, and humans occasionally (Larrasa *et al.*, 2004; Radostits *et al.*, 2007). It is a cause for reduction of milk production (Dalis *et al.*, 2007) down grading of hides quality, skin and wool (Woldemeskel, 2000) and affecting weight gain and reproductive performance (Chatikobo *et al.*, 2004).

In Ethiopia, dermatophilosis is enzootic (FAO, WHO, OIE, 1997) and is recently reported as a treat to livestock production in the country and need appropriate control measure (Woldemeskel and Taye, 2002). On the other hand, increasing human population and urbanization trends cause to a substantial increase in the demand for milk and meat in the country (Azage *et al.*, 2001) and leads to have a significant percentage of crossbred cattle in the years to come where large number of potential animal diseases including dermatophilosis is prevalent. Factors involved in establishment and spread of the disease are not known. Even though there are limited published reports regarding the disease in cattle (Berhanu and Woldemeskel, 1999; Woldemeskel and Taye, 2002; Kassaye *et al.*, 2003), they are restricted to some parts of the country. Therefore, information regarding this

important disease is lacking in north western Ethiopia where there are large population of cattle. For this reason, this current study was carried out to assess the prevalence and associated epidemiological risk factors of cattle dermatophilosis in urban and periurban areas of Bahir Dar, north western Ethiopia.

MATERIALS AND METHODS

Study area and study population: The study was conducted in urban and periurban areas of Bahir Dar, north western Ethiopia from October 2008 to March 2009. It is one of the dairy development areas of Amhara national regional state. The area is located between 9°20' and 14°20' latitude north and 30°20' and 40°20' longitude east. It has altitude range of 1500-2300 m above sea level and temperature of 10-20°C with warm humid climate. The area has a summer rainfall from June to September which causes the area to have average annual rainfall of 1200-1600 mm. The area has dry winter from December to March (CSA, 2008). Study animals were kept for dairy in the urban area, where as they were kept both for dairy and draught power in the periurban area. Male cattle are used for traction and threshing of crops. In the periurban, mixed crop-livestock production farming system was practiced.

Study protocol: It was cross-sectional study conducted on indigenous zebu (n = 3181) and Holestien-zebu cross (n = 275) cattle. The variable of interest considered as an output variable versus risk factors was skin scrapings status for *D. congolensis*. Breed, sex and age of studied cattle, and season of the year and tick infestation were considered explanatory variables. Animals were grouped as young if <6 months old and adults otherwise. Age was determined according to the description given by Aiello and Mays (1998).

Study animals were selected randomly and examined for any skin lesion by visual inspections and palpations. Skin scrapings were collected for direct microscopic examination and cultural isolation. Giemsa stained smears were examined from freshly removed skin scrapings and presence of *D. congolensis* was confirmed by demonstration of typical organisms showing transverse and longitudinal septation. Skin scrapings which were negative by Giemsa were cultured by Haalstra's method as described by Quinn *et al.* (1999). Colonies of *D. congolensis* were identified by rough, wrinkled and golden-yellow characteristic colonies and biochemical tests. Ticks were collected in 70% alcohol and identified as described by Walker *et al.* (2003). Univariate and multivariable logistic regressions were used to test presence of statistical association between risk factors and dermatophilosis. Odds ratio was used to calculate degree of association. In all the analyses, confidence level was held at 95% and $p \leq 0.05$ was considered as significance.

RESULTS

Thirty six of the 3456 animals examined (1.04%) had clinical dermatophilosis; of these animals, 26 (72.22%) were positive by Giemsa staining technique while the rest 10 (27.78%) were confirmed by biochemical tests after bacterial culture (Table 1). Skin lesions observed in 4.31% (149 of 3456) animals.

Prevalence of dermatophilosis in cross bred cattle (5.5%) was statistically significant ($p \leq 0.05$) than the prevalence in indigenous zebu cattle (1.7%). Higher prevalence was recorded in wet season and in *Amblyomma variegatum* infested cattle. Of the five different risk factors considered, breed, sex, season and tick were significantly associated ($p < 0.05$) with dermatophilosis by univariate logistic regression analysis. There was no significant association ($p > 0.05$) between age *D. congolensis* infection (Table 2).

When potential risk factors (breed, sex, season, and tick infestation) which were significantly associated with dermatophilosis by univariate analysis were subjected to multivariable logistic regression analysis, breed was the only variable significantly associated ($p < 0.05$) with dermatophilosis with 9.49 odds ratio and 3.12-28.86 confidence interval.

DISCUSSION

Thirty six of the 3456 animals (1.04%) had clinical dermatophilosis which was lower than the report of

Table 1: Prevalence of dermatophilosis in cattle with skin lesions in wet and dry seasons examined by Giemsa and culturing techniques

Season	No. of animals examined	No. of animals			
		With skin lesion (%)	With dermatophilosis		Total positive (%)
			By Giemsa (%)	By culture (%)	
Wet	1728	117(6.77)	19(1.09)	9(0.52)	28(1.62)
Dry	1728	32(1.85)	7(0.4)	1(0.06)	8(0.46)
Total	3456	149(4.31)	26(0.75)	10(0.29)	36(1.04)

Table 2: Association of risk factors with *Dermatophilus congolensis* infection using univariate logistic regression

Risk factors	No. of animals		OR	OR 95% CI	p-value
	Examined	Positive			
Breed					
Indigenous zebu	3181	21(0.66)	8.7	4.422-17.043	0.00
Cross	275	15(5.45)			
Sex					
Male	977	17(1.74)	2.3	1.187-4.429	0.01
Female	2479	19(0.8)			
Age					
Young	1525	12(0.77)	0.6	0.314-1.264	0.19
Adult	1931	24(1.24)			
Season					
Wet	1728	28(1.62)	3.5	1.609-7.791	0.00
Dry	1728	8(0.46)			
Tick infestation					
Present	943	25(2.65)	6.2	3.036-12.639	0.00
Absent	2513	11(0.44)			

Berhanu and Woldemeskel (1999) and Kassaye *et al.* (2003) who reported prevalence of 5.1 and 5.22% from their study in central and northern Ethiopia, respectively. The occurrence of higher prevalence of clinical dermatophilosis in cross bred cattle was in agreement with the report of Woldemeskel (2000) and Kassaye *et al.* (2003). Similarly, higher prevalence of dermatophilosis was reported in Friesian-Jersey crosses than in local cattle from Ghana (Koney and Marrow, 1990). However, it contradicts with the work of Woldemeskel and Taye (2002) who reported higher level of dermatophilosis in indigenous zebu cattle.

The higher prevalence of dermatophilosis (1.7%) recorded in male cattle was in agreement with the work of Woldemeskel and Taye (2002). However, Samui and Hugh-Jones (1990) reported higher level of prevalence in female cattle than in the males. The higher prevalence in male cattle in the current study might be associated with suppression of immunity due to work overload on male cattle and/or use of same draught materials which favors transmission of the disease. Higher prevalence of dermatophilosis recorded in adult cattle was in agreement with the work of Woldemeskel and Taye (2002); might be explained from the point of predisposing factors as adult cattle are more exposed to the disease by environmental factors like thorny bushes, thorns, ticks, insects, ox-pecker birds and rain. Higher prevalence of the disease recorded in wet season might be associated with rain and insect population density which cause flare-up of dermatophilosis as described by Shoorijeh *et al.* (2008).

Prevalence of dermatophilosis in cattle infested with *A. variegatum* (2.7%) was significantly higher ($p < 0.05$) than in animals free of tick infestation (0.4%). Similar findings had been reported by Kassaye *et al.* (2003). As described by Msami *et al.* (2001) mechanical injury to the skin and tick infestation involved in the pathogenesis of the disease. In conclusion, prevalence of clinical dermatophilosis was higher in cross bred cattle, in male cattle, in wet season, and in animals' infested with ticks and all were significantly associated with dermatophilosis by univariate logistic analysis. However, breed was the only risk factor significantly associated with dermatophilosis by multivariable logistic analysis. The study indicated dermatophilosis is a potential determinant factor for the dairy development started through cross breeding in the study area. Therefore, tick control especially on crossbred cattle is suggested to reduce the risk of dermatophilosis.

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REFERENCES

- Aiello, S.E. and A. Mays, 1998. The Merck Veterinary Manual. 8th Edn., Merck and Co. Inc. White House Station, NJ, USA., pp: 131-133.
- Azage, T., R. Tsehay, G. Alemu and K. Hizkias, 2001. Milk recording and herd registration in Ethiopia. Proceedings of the 8th Annual Conference of the Ethiopian Society of Animal Production (ESAP), 24-26 August 2000, Addis Ababa, Ethiopia, pp: 90-104.
- Berhanu, D. and M. Woldemeskel, 1999. Bovine dermatophilosis and its influencing factors in central Ethiopia. J. Vet. Med., 46(10): 593-597.
- CSA, 2008. Ethiopian Agricultural Sample Enumeration. Result for Amhara Region, Statistical Report on Livestock Farm Improvement.
- Chatikobo, P., N.T. Kusina, H. Hamudikuwanda and O. Nyoni, 2004. A Monitoring Study on the Prevalence of dermatophilosis and parafilariosis in cattle in a small holder semi-arid farming area in Zimbabwe. Trop. Anim. Hlth. Prod. 36(3): 207-215.
- Dalis, J.S., H.M. Kazeem, A.A. Makinde and M.Y. Fatihu, 2007. Agalactia due to severe generalized dermatophilosis in a white Fulani cow in Zaria, Nigeria. VJVS, 1(4): 56-58.
- FAO, WHO, OIE, 1997. Animal Health Year Book. Rome, Italy, pp: 281-285.
- Kassaye, E., I. Moser and M. Woldemeskel, 2003. Epidemiological study on clinical bovine dermatophilosis in Northern Ethiopia. Deutsche Tierärztliche Wochenschrift. 110: 422-425.
- Koney, E.B. and A.N. Marrow, 1990. Streptothricosis in cattle on coastal plains of Ghana: A comparison of a disease in animals reared under two different management systems. Trop. Anim. Hlth. Prod., 22: 89-94.
- Larrasa, J., A. Garcia-Sanchez, N.C. Ambrose, A. Parra, J.M. Alonso, J.M. Rey, M. Hermoso-de-Mendoza and J. Hermoso-de-Mendoza, 2004. Evaluation of randomly amplified polymorphic DNA and pulsed field gel electrophoresis techniques for molecular typing of Dermatophilosis congolensis. FEMS Microbiol. Lett., 240: 87-97.
- Msami H.M., D. Khascagi, K. Schopl, A.M. Kapaga and T. Shitahara, 2001. *Dermatophilus congolensis* in goats in Tanzania. Trop. Anim. Health Prod., 33: 367-377.

- Quinn, P.J., M.E. Carter, B.K. Markey and G.R. Carter, 1999. *Clinical Veterinary Microbiology*. Harcourt Publishers Ltd., Edimburgh, Longon, pp: 153-155.
- Radostits, O.M., C.G. Gray, K.W. Hinchcliff and P.D. Constable, 2007. *Veterinary Medicine, A Text Book of the Disease of Cattle, Horses, Sheep, Pigs, and Goats*. 10th Edn., SaundersElsevier. London, pp: 1048-1051.
- Samui, K.L. and M.E. Hugh-Jones, 1990. The epidemiology of bovine Dermatophilosis in Zambia. *Vet. Res. Comm.*, 14: 267-278.
- Shoorijeh, J.S., K.H. Badiie, M.A. Behzadi and A. Tamadon, 2008. First report of Dermatophilosis congolensis dermatitis in dairy cows in Shiraz, southern Iran. *Iranian J. Vet. Res.*, Shiraz University, 9(3): 281-283.
- Walker, A.R., A. Bouattour, J.L. Camicas, A. Estrada-Peña, I.G. Horak, A.A. Latif, R.G. Pegram and P.M. Preston, 2003. *Ticks of Domestic Animals in Africa: A Guide to Identification of Species*. Bioscience Reports, U.K.
- Woldemeskel, M., 2000. Dermatophilosis a threat to livestock production in Ethiopia. *Dtsch Tierarztl wschr*, 107: 144-146.
- Woldemeskel, M. and T. Taye, 2002. Prevalence of bovine dematophilosis in tropical highland region of Ethiopia. *Trop. Animl. Hlth. Prod.*, 34: 189-194.