

## Clinical and Serological Investigation of Brucellosis Cases in Small Ruminant Farm: in Case of Raya Alamata District, Northern Ethiopia

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**Abstract:** Rapid diagnosis of small ruminant abortion was done at one flock in response to a small holder farmer request to know cause of abortion. It was very important to support the farmer and address the problem to maintain sustainable solution. This case study was conducted in April 2015 in response the farm owner far rapid diagnosis to his animals (sheep and goats) to get answer for the repeated abortion he faced. Integrated diagnosis method was used with available resource at the farm level. History, clinical sign and serum samples was collected in reaching the cause of abortion. We hypothesize the abortion could be due bacterial pathogen and specifically brucellosis that noising the farmer by affecting his flock of repeated abortion. All animals in the flock were diagnosed using serological tests (Rosbengal plate test and complement fixation test) based on that goats/sheep were identified that got abortion, swelling and lameness. Accordingly the overall individual animal sero-prevalence of brucellosis was 12(19.35%) in the flock and adult animals were more positive to the suspected infection, brucellosis, based on the result of complement fixation test.

**Key words:** Abortion • Alamata • Brucellosis • Small Ruminant

### INTRODUCTION

Sheep and goats contribute a quarter of the domestic meat consumption in Ethiopia; about half of the domestic wool requirements; about 40% of fresh skins and 92% of the value of semi-processed skin and hide export trade. It is estimated that 1,078,000 sheep and 1,128,000 goats are used in Ethiopia for domestic consumption annually. There is also a growing export market for sheep and goat meat. Major constraints of sheep and goat production are high mortality due to different diseases and scarcity of feed [1].

Brucellosis is a sub-acute or chronic disease which may affect many species of animals. In cattle, sheep, goats, other ruminants and pig in the initial phase following infection is often not apparent. In sexually mature animals infection localizes in the reproductive system and typically produces inflammation of placenta and abortion in pregnant female animals during the third trimester of pregnancy. In males it is manifested by epididymitis and orchitis [2]. The genus *Brucella* is small gram negative facultative intracellular pathogen that induces abortion in variety of animals. The genus is

classified in to six species and has their own host preference [3].

Infections in small ruminant are highly contagious because of the pathogenesis of *Brucella melitensis* and because of close contact caused by the density of the flock. The intra animal transmission occurs as a result of large number of organisms shed in the environment [2].

In Ethiopia small ruminant brucellosis is reported as a continuous problem by many researchers from the serological point of view [4, 5] and specifically it was reported higher in Raya-Alamata district, southern zone of Tigray region [6]. Thus, here we report brucellosis case investigation set in response to the farmer's need of investigation to his farm to the possible cause of abortion and implementation of control measure. We followed conventional diagnosis procedure; history, clinical sign and serology to reach the possible cause of abortion.

**Case Report:** A farmer named Mola Tukuye complained to Alamata Agricultural Research center and to district Bureau of Agriculture that his farm is fronting continuous abortion problem. The farmer added that the continuous abortion have occurred since the past five years with his

flocks at both stages of pregnancy and particularly 10 animals abort since the past 6 month. In response to his request for cooperation we followed the conventional diagnosis methods i.e., history, clinical sign and serological methods to reach the possible cause of abortion underlining that brucellosis could be the most important one.

### RESULT

**Owner Interview and Clinical Diagnosis:** The farm owner has given different information related to his farm characteristics and clinical examination was done for each of 40 goats and 22 sheep. From all these four female goats and one buck and also sheep were with signs of arthritis and lameness as shown in 1. Eleven goats and five sheep were rose Bengal positives as indicated in Table 1. Formerly the farm was established before ten years with small number of animals, currently reached above 60 in number. The most common diseases that affect the farm were Pes des petites ruminates (PPR), pastuerollosis and abortion from unknown cause. From the listed one,

abortion was still enzootic in nature which begins before five years. The abortion was very common in both early and late gestation period. The disease mostly affects goats than sheep accordingly, this year more than ten goats got aborted. Following this other sign usually observed was swelling of joints manifested by lameness which affects both sex of animals. Accordingly at the current diagnosis around seven animals get sign of arthritis during time of sample collection. The frequent existing nature of disease was due to unknown source of replacement stock. from the total samples collected 40 goat and 22 sheep samples were collected. From these only 11 male animals were found. Accordingly the overall prevalence of the disease was 12 (19.35%). The prevalence were 8 (20%) in goats and 4 (18.18 %) in sheep according to Table 1.

The strength of association were done using Pearson chi-square test for each variable using complement fixation test as golden standard test, accordingly the age level of animal have significant importance for the disease susceptibility as indicated in Table 2.

Table 1: The prevalence of individual animals.

variables		Rosebnegal plate test (RBPT)				Complement fixation test (CFT)			
		Negative	%	Positive	%	negative	%	Positive	%
Species of animal	Caprine	29	72.5	11	27.5	32	80	8	20
	ovine	17	77.27	5	22.7	18	81.8	4	18.18
Sex	m	8	72.27	3	27.2	9	81.8	2	18.18
	F	38	74.5	13	25.4	41	80.3	10	19.60
Age	Young	17	89.4	2	10.5	19	100	0	--
	adult	29	67.4	14	32.5	31	72.09	12	27.9
Parity	0	10	90.9	1	9	11	100	0	---
	1	8	88.88	1	11.11	8	88.88	1	11.11
	2	8	66.66	4	33.33	7	58.3	5	41.66
	3	9	64.2	5	35.7	11	78.5	3	21.4
	4	3	60	2	40	4	80	1	20
History of abortion and artheritis	yes	7	38.8	11	61.1	12	66.66	6	33.33
	No	39	88.6	5	11.3	38	86.3	6	13.6

Table 2: The statistical significance of the variables at (p < 0.05) using chi- square test

Variables	Value	Df	P – Value
Species of animal	0.030 <sup>a</sup>	1	0.862
Sex	0.012 <sup>a</sup>	1	0.914
Age	6.575 <sup>a</sup>	1	0.010
Parity	6.829 <sup>a</sup>	4	0.145
history of abortion and artheritis	3.175 <sup>a</sup>	1	0.075
Rosbengal plate test	33.710 <sup>a</sup>	1	0.00



A. Lameness



B. Swelling/Artheritis

Fig. 1: Clinical cases observed during lameness and swelling/artheritis.

## DISCUSSION

According to the farm in the current study, many diseases were affecting his farm like pastuerollosis, *Pes des petites ruminates* (PPR) and abortion which agrees with [7, 8]. From these pastuerollosis and abortion most frequently affects his farm and as well as in the district at large. This similarly explained by the previous study in Alamata district [6, 9]. Rearing of sheep and goat together was the common practice in the area. The replacement stock of farm animals were purchased from unknown market source without screening test for presence or absence of the disease. The last trimester abortion was common in the study farm this agrees with finding of [10, 11].

In the current study the overall prevalence was 19.35%, which was found to be higher. But similar finding with [12]. Which were 19.4%, But higher than other finding by [6, 11, 13]. This was due to the number of animals sampled taken were small in the current study as well as the study was conducted in a single flock animals that commonly shares everything in the farm.

In this study the association of different variables were studied using serological test results, accordingly the susceptibility adult animals were found highly significance ( $P = 0.010$ ) for of the disease infection. This agrees with most of the previous studies by [13, 10, 6]. This was due the nature of *Brucella* bacteria that usually first multiplies in mature reproductive organs. The association of sex and species of animals has no significance which contradicts with other finding by [13, 10,]. This was due to the number samples taken in the previous study were higher. In the current study the parity of animals have got

no significance ( $P = 0.075$ ) for the *Brucella* susceptibility which agrees with the finding by [6]. Once infected the organism circulates in the blood of animals.

## CONCLUSIONS

The study of small ruminant brucellosis was highly prevalent in the farm and though frequent abortion also occurs. The adult animals are carriers of the disease that circulates the disease in the farm. The sex, abortion history and species of animals were no significance for the disease susceptibility so that farm should be re-established.

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