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## Etio-prevalence of sub clinical mastitis in crossbred cattle

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### Abstract

The aim of the present investigation was to assess the efficacy of California mastitis test (CMT) to detect sub clinical mastitis (SCM) and to study its etio-prevalence in crossbred cattle. In the present study, out of 112 crossbred cows studied, 63 were positive for subclinical mastitis. Among a total of 428 quarters, 142 quarters were found positive for subclinical mastitis. The overall and quarter wise prevalence of subclinical mastitis was computed to be 56.25% and 33.17% respectively. *Staphylococcus* sp. (66.90%) *Streptococcus* sp. (23.23%) and *Escherichia coli* (2.81%) were the most prevalent bacterial agents. Quarter wise highest (31.57%) infection of *Staphylococcus* spp. was observed in right hind quarter followed by left hind quarters (29.47%), right fore quarters (20.00%) and left fore quarters (18.94%). Quarter wise highest (31.57%) infection of *Staphylococcus* spp. was observed in right hind quarter followed by left hind quarters (29.47%), right fore quarters (20.00%) and left fore quarters (18.94%). *Streptococcus* spp. infection was found maximum (36.36%) in left hind quarter followed by right hind quarters (33.33%), and left fore quarters (18.18%) and right fore quarters (12.12%). Two cases (50%) of *E. coli* were seen in right hind quarter while one case each was seen in both left hind and right front quarter. Mixed infection was recorded greatest (40.00%) in left hind quarter.

**Keywords:** Etio-prevalence, Sub clinical mastitis, California mastitis test, *Staphylococcus*.

### Introduction

Bovine mastitis has remained one of the major constraints in growth of dairy industry in India and abroad [15]. Mastitis is the inflammation of mammary gland characterized by swelling, heat, redness, hardness and pain with abnormalities in milk [5] but subclinical mastitis is bereft of any obvious manifestation of inflammation and is characterized by having no visible signs either in the udder or in the milk, but the milk production decreases and there is change in milk composition [6]. The detection of developing subclinical mastitis depends upon bacteriological examination of milk and/or indirect assessment of udder inflammation for which many efforts have been made from time to time to develop an effective inflammatory indicator. Subclinical mastitis is 3-40 times more common than clinical mastitis. About 75-80% mastitis is subclinical, characterized by a significantly increased leukocyte count in milk [3]. Losses due to subclinical mastitis are more severe than those due to clinical cases [11]. This disease also poses a risk for the transmission of major zoonotic diseases like tuberculosis, brucellosis, leptospirosis and streptococcal sore throat to human beings [1]. Identification of mastitis causing pathogen and the results of antibiotic resistance pattern of the isolated bacteria are important prerequisites for implementation of effective control of mastitis. At least, 137 infectious causes of bovine mastitis are known to date, and the commonest pathogens are *Staphylococcus aureus*, *Streptococcus agalactiae*, other *Streptococcus* species and Coliforms [16].

### Materials and methods

#### Initial Screening of Cows for Subclinical Mastitis

All the lactating crossbred cows (112 cows) at Instructional Dairy farm (IDF), G.B. Pant University of Agriculture and Technology, Pantnagar, District Udham Singh Nagar, Uttarakhand, India were screened for SCM using California Mastitis Test (CMT). The milk samples (about 10 to 15 ml) from individual quarter were collected in sterilized test tubes after cleaning the teat orifice with 70% ethyl alcohol and after discarding the first few streams of milk. The milk samples found positive by CMT were kept in ice box and immediately brought to the department laboratory for further analysis.

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### California mastitis test

The test was conducted and interpreted as per standard method [13]. The results were read as negative (-), trace, one plus (+), two plus (++) and three plus (+++) depending upon the degree of gel formation and graded as 0, 1, 2, 3 and 4, respectively.

### Isolation and identification of bacteria (*in vitro*)

The milk samples brought to the laboratory were mixed thoroughly and streaked on nutrient agar plates. Each plate was divided into four equal parts for inoculation of samples from four quarters of each cow. The sample was streaked in the respective parts of the agar plates with sterilized platinum loop and was incubated aerobically at 37°C for 24 to 36 hours. The individual bacterial colonies were noted and the organisms were identified on the basis of colony morphology, characteristic haemolytic pattern, and Gram's staining.

### Bacterial investigation

The different milk samples were analyzed for *Staphylococcus aureus*, *Streptococcus agalactiae*, *E. coli* and mixed infection in positive cases of subclinical mastitis.

### Quarter infection rate wise prevalence

It was done by observing the type of bacteria affecting the

individual quarters.

### Results and discussion

Of 112 crossbred cows studied, 63 were found positive for subclinical mastitis. Among a total of 428 quarters, 142 quarters were found positive for subclinical mastitis. The overall and quarter wise prevalence of subclinical mastitis was computed to be 56.25 and 33.17 % respectively. Similar findings have been previously reported by earlier workers [7, 9]. Bacterial investigation of total 142 milk samples positive for subclinical mastitis revealed that 95 (66.90%) samples were positive for *Staphylococcus* spp., 33 (23.23 %) samples were positive for *Streptococcus* spp., 04 (02.81 %) samples were positive for *E. coli* and 10 (07.04 %) samples were positive for mixed infection (Table 1). Similar findings have been previously reported by many workers [7, 9, 2, 11, 14]. Such a high involvement of *Staphylococcus* spp. observed during the present investigation would be attributed to the ability of the bacteria to colonize on the teat ends and teat canal weeks before invading the upper parts of mammary gland and to their survival on the skin for longer period causing new intramammary infection of subclinical in nature [4]. However, lower percentage of *Staphylococcus aureus* and *Streptococcus* spp. isolates were identified from crossbred cows [8, 10].

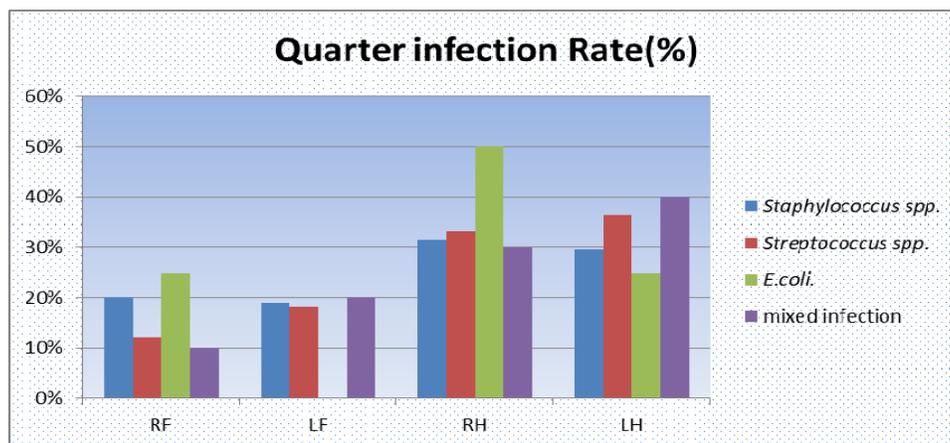
**Table 1:** Quarter wise association of bacteria in subclinical mastitis affected cows

Bacteria	Quarter affected				Total
	RF	LF	RH	LH	
<i>Staphylococcus</i> spp.	19 (20%)	18 (18.94%)	30 (31.57%)	28 (29.47%)	95 (66.90%)
<i>Streptococcus</i> spp.	4 (12.12%)	6 (18.18%)	11 (33.33%)	12 (36.36%)	33 (23.23%)
<i>E. coli</i>	1 (25%)	0 (0%)	2 (50%)	1 (25%)	4 (2.81%)
Mixed infection	1 (10%)	2 (20%)	3 (30%)	4 (40%)	10 (7.04)

### Quarter infection rate wise prevalence

Quarter wise highest (31.57 %) infection of *Staphylococcus* spp. was observed in right hind quarter followed by left hind quarters (29.47 %), right fore quarters (20.00 %) and left fore quarters (18.94 %) (Table 1; Figure 1). *Streptococcus* spp. infection was found maximum (36.36%) in left hind quarter followed by right hind quarters (33.33 %), and left fore

quarters (18.18 %) and right fore quarters (12.12 %). Two cases (50 %) of *E. coli* were observed in right hind quarter while one case each was seen in both left hind and right front quarter. Mixed infection was recorded greatest (40.00 %) in left hind quarter (Table 1). Similar findings for Quarter wise prevalence had been reported by earlier workers [7, 9].



**Fig 1:** Quarter infection rate of subclinical mastitis in lactating cows on the basis of microbiological examination

### Conclusion

The subclinical mastitis is a more serious concern and is responsible for much greater losses to the dairy industry in India. The prevalence of subclinical mastitis was recorded 56.25% in cross bred cows. Out of total 142 positive samples, 95 (66.90%) samples were positive for *Staphylococcus* spp.,

33 (23.23%) for *Streptococcus* spp., 04 (02.81%) for *E. coli* and 10 (07.04%) for mixed infection. Quarter wise highest (31.57%) infection of *Staphylococcus* spp. was observed in right hind quarter followed by left hind quarters (29.47%), right fore quarters (20.00%) and left fore quarters (18.94%).

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