

**Review
Of
Literature**

PART-I

R E V I E W O F L I T E R A T U R E

The review of literature concerning bovine mastitis is dealt with in four parts.

Part - I : Epidemiology of bovine mastitis.

Part - II : Cultural examinations.

Part- III : Sensitivity tests.

Part - IV : Treatment.

PART - I : EPIDEMIOLOGY.

Rathore (1970) analysed a data on 200 cows and showed that the average annual decline on solids-not-fat was 0.037% in cows without clinical mastitis and 0.067% in those with mastitis.

Bozhkova (1973) made a survey in 1970 and 1971 involving over 19,000 cows on 54 farms in 12 regions of Bulgaria. Mastitis was found in 3,836 (20%) of cows. Frequently in different breeds was 15% in Bulgarian Brown, 20% in Bulgarian Simmental, 23% in Red and 26% in Black Pied cows. Catarrhal mastitis was the commonest form (53% of the cases). 28% of cases occurred in the first month of lactation, 13% in the second, 15% in the third and 8% in the fourth month.

Walser et al. (1973) analyzed a data for 994 cows and showed that 93% of cases, only one quarter of the udder was affected. Hind quarter was affected in 67% and a fore quarter in 33% of these cases.

Yurkov (1977) compared the occurrence of subclinical mastitis among cows of different breeds (Bulgarian brown, Bulgarian Simmental, Black Pied and Bulgarian red). Tests on the milk of over 12,000 cows belonging to four breeds showed that breed had little influence on the occurrence of subclinical mastitis in Bulgaria. Hygienic and bacteriological factors were more important than breed.

Batra et al. (1977) observed the incidence of clinical mastitis in 760 lactations of 331 Holstein cows and studied effects of sire, parity, and month of calving. Incidence of clinical mastitis was higher in hind quarters, than fore quarters. Results indicated that occurrence of mastitis in one quarter was associated with above average frequencies of mastitis in the other quarters of the same cow. Clinical mastitis increased with increase in lactation number upto the fourth lactation. Cows calving in January and February had mastitis more frequently than those calving in March and April.

Verma (1978) carried out the California Mastitis Test, with confirmation by cell count and bacteriological examination, in 245 cows of four breeds at a breeding station. Losses attributable to subclinical mastitis were greatest among Gir cows (9%) than Holstein - Friesian x Thari cross breeds (3%) with Danish Red and Tharparkar intermediate. It is acknowledged that managemental factors were probably more important than breed.

Kapur and Singh (1978)^(b) reported that clinical mastitis was present in one or two quarters in 37% of 63 cows, 40% of 60 buffaloes. Rear quarters were infected most frequently, especially in buffaloes. Occurrence of clinical mastitis was highest in the third lactation in cows, and the fourth lactation in buffaloes, also in the third and fourth months of lactation.

Hegemann (1978) stated that the bacterial contamination of the mammary gland and it was influenced by following factors:

- 1) Age : Contamination reached a maximum at seven years.
- 2) Lactation : During the year, contamination reached a maximum at the tenth month.
- 3) Milk yield : Cows producing over five litres per milking were more susceptible to contamination.
- 4) Size of the farm : The smaller the farm, the less was the risk of contamination.

Misra (1978) screened, 346 buffaloes (1,112 milk samples from various farms in Uttar Pradesh and observed that 28 were found positive (8%); 6% due to streptococci and 1.7% due to staphylococci. The incidence of subclinical, clinical and chronic mastitis in the affected quarters was 89%; 7% and 3.6% respectively. The incidence of streptococcal mastitis (79%) was higher than that of staphylococcal mastitis (19%). Clinical cases were mainly due to staphylococci, whereas subclinical and chronic cases were due to streptococci.

Streptococcus equisimilis was the most prevalent. Mastitis occurred during the first to sixth lactations and was almost equally distributed in three different stages of lactation.

Rajo Vazquez et al. (1979) reported that milk samples from 464 quarters from 116 cows in full lactation from various herds were examined bacteriologically and for cell counts. Sixty cows showed subclinical mastitis, which was less frequent in cows in their first lactation or in the first four months of any lactation.

Noori and Tauro (1979) screened, milk samples from 50 cows (200 samples) and 40 buffaloes (160) for the California Mastitis Test. 35% and 27.5% of cases respectively were positive. 76% of cows and 56.5% of buffaloes had subclinical mastitis. Of 70 and 44 CMT positive milk samples from cows and buffaloes, 44 (63%) and 30 (68%) contained S.aureus; however the actual number of quarters infected by S.aureus in cows and buffaloes was only 20% and 21% respectively. It was concluded that S.aureus was not a major cause of subclinical mastitis in these animals.

Ruffo et al. (1979) carried out cell counts, on quarter samples collected regularly from a herd of 170 Holstein cows during two years. Graphs demonstrate the increase in cell count with each month of lactation; such increases were greater during the second and subsequent lactation than during the first lactation.

Park (1980) isolated 148 cultures of gram-negative bacilli from clinical cases of mastitis over a two year period in six dairy herds. Most of these isolates (75%) were obtained from rear quarters.

Verma et al. (1980) observed that 562 quarters of 141 apparently healthy cows on the Government Cattle Farm, Patna, 73 (13%) quarters of 43 (30%) cows proved to have subclinical mastitis.

Prandzhev et al. (1980) detected subclinical mastitis in 68% of 2,377 cows of eight herds. On average, only one quarter was affected. Abnormal milk secretion (non-specific mastitis) was present in one-third of the cases; while the remainder had bacterial infection which was more often subclinical mastitis than latent infection.

Singh and Baxi (1980) studied on the incidence and diagnosis of mastitis in milch animals. Bacteriological and other techniques applied to milk samples from 50 cows, 88 buffaloes revealed subclinical mastitis in 27 cows and 21 buffaloes. According to quarters examined in cows 27.75% and in buffaloes 42.57% incidence. They found the incidence increasing according to lactations i.e. first lactation (cow 20.57%; buffalo 8.33%), second lactation (cow 42.86%; buffalo 11.11%), third lactation (cow 60%; buffalo 23%), fourth lactation (cow 66.67%; buffalo 60%), fifth lactation (cow 100%; buffalo 75%), sixth and above (cow 80% and buffalo 83.33%). Distribution of incidence with number of infected quarters along with percentage, one (cow, 40.74%; buffalo, 42.86%), two (cow, 33.33%; buffalo 23.81%),

three (cow, 14.91%; buffalo 14.28%), four (cow, 11.11%; buffalo 19%) and percentage of different quarters affected with subclinical mastitis was LF (cow, 18.97%; buffalo, 20.43% LH (cow, 26.41%; buffalo, 29.54%), RF (cow, 22.64%; buffalo, 15.91%), RH (cow, 32.07%; buffalo, 34.09%).

Gonzalez et al. (1981) stated that, thirty dairy farms, 18 with machine milking and 12 with hand milking were visited on a single occasion in Cordoba province in 1977. Milk sample of cows from 4,168 quarters showed, 2,388 (57.3%) positive to the California Mastitis Test. A lower frequency of subclinical mastitis was seen in cows in first lactation. A higher percentage of Staph. aureus and the three streptococcal specie in the hand milked farms were considered to be due to a low level of hygiene.

Rupasinghe and Kulasegaram (1981) observed in four Government farms with purebred European breeds of cattle and in five private dairies with crossbred cows in smaller units the prevalence of subclinical mastitis ranged from 27.8% to 92.2% cows (11.8% - 97.3% of quarters).

Singh et al. (1982) detected subclinical mastitis in 258 (18%) of 1,400 cows and 67 (13%) of 508 buffaloes. Staphylococci, were associated with 78% of cases of mastitis in cows and 61% in buffaloes. Streptococci were associated with 20% and 23% of cases, respectively. Clinical examination of 1,908 udders revealed blind teats in 10%.

Egan (1982) carried out a California Mastitis Test (CMT) on quarter milk samples of 3,029 lactating cows on 30 farms in Dublin (1980). A CMT reaction of ++ or higher was found in 1,252 (10.3%) quarters. Signs of clinical mastitis were observed in 66 (0.5%) quarters. Quarters showing a CMT reaction of +++ or signs of clinical infection were sampled aseptically for bacteriological examination. Pathogenic bacteria were isolated from 416 (76.3%) of the quarters showing a +++ CMT reaction. Staphylococcus aureus was the principal bacterium isolated from quarters.

Brooks et al. (1982) stated that the proportion of cows from which a bacterial pathogen was isolated, increased with age but not with the stage of lactation.

Daniel et al. (1982) found that there was a highly significant relationship between cow age group and the proportion of affected quarters and it was calculated that the change with each year of age was a 55% increase over the previous year.

Bakken (1982) studied subclinical mastitis in Norwegian dairy cows, prevalence rates and epidemiological assessments. From November, 1976 to December, 1979 quarter samples were collected twice a year from 328 commercial dairy herds. A total of 1,40,243 quarter samples from 35,464 cow units were examined. The average prevalence rate of subclinical mastitis was 31% of the cows and 11.6% of quarters. Almost 50% of the

cases were nonspecific mastitis. Staph. aureus was the main pathogen isolated. The average prevalence of S. aureus was 10.6% of cows and 3.3% of quarters, while the prevalence of all infectious mastitis was 19.9% of cows and 6.5% of quarters. The mastitis prevalence varied in relation to the number of lactation, lactation stage and geographical origin of the herds.

Yass et al. (1983) studied mastitis in 181 buffaloes in 1981-82, of which 70 were from the Government farm at Missan and 81 were from four private farms near Baghdad (Iraq). The prevalence of clinical mastitis was 25.17% (12.08% on quarter basis) and that of subclinical mastitis 31.94% (11.68% on quarter basis). Rear quarters were affected more frequently than the fore quarters. Staphylococcus aureus was the chief aetiological agent in both clinical and subclinical mastitis, followed by Streptococcus agalactiae, Str. - dysagalactiae and Corynebacterium pyogenes. Prevalence of mastitis increased with lactation number and age; it was highest during the fifth lactation and at nine to ten years of age. Incidence was higher during the first two months of lactation, declining during subsequent months.

Wulfmeyer (1983) found that there was a close correlation between increase in age and frequency of subclinical mastitis which was highest in cows six years old. There was also a very close correlation between subclinical mastitis and milk yield in both groups.

Blood et al. (1983) related mastitis susceptibility of cow, to 1) Stage of lactation (first two months)
 2) Age of cow (older).
 3) Level of inherited resistance, possibly related to teat shape and anatomy of the teat canal.

Rahman et al. (1984) diagnosed subclinical mastitis in 113 (59.2%) of 191 cows and 32 (36.8%) of 87 buffaloes in six dairy herds. Incidence was high in second and third lactation cows (four to six years old) and in third and fourth lactation buffaloes (six to eight years old). Four quarter infections were common in cows (35, 31.0%) and single quarter infection frequent in buffaloes (14, 43.8%). 240 milk samples from 103 cows and 60 milk samples from 3 buffaloes were examined for bacteria. 95 (92.2%) cows and 22 (68.8%) buffaloes were positive.