# Results

# R E S U L T S

## General Observations on Incidence of Bovine Mastitis :

We had studied the incidence of mastitis (Epideomiological one aspect) on very limited number of cattle and buffaloes so whatever our findings regarding incidence of bovine mastitis were as follows.

1. Breed : In cattle, according to breedwise, Gir (41.86%) Gir X Holstein Friesian crossbreds (50.94%) and Gir X Jersey crossbreds (21.95%) incidence of mastitis was recorded.

2. Age : After 8 years, incidence of mastitis increased above 50 %, in cattle and buffaloes.

3. Number of Lactations : Out of 64 positive cases of bovine mastitis, in various lactations, 26 cases were in third and fourth lactations (40.62 %).

4. Number of Quarters : Incidence recorded as one quarter infected (65 %), two (24 %), three (9 %) and all four (2%) in cattle, while in buffaloes cases were with single quarter infections.

5. Type of Quarter : According to quarter types, incidence of mastitis was found nearly equal in hind and fore quarters in cattle. But in buffaloes, out of ten cases of mastitis, nine were from hind quarters.

Table : 1 : Incidence of Subclinical mastitis
(Modified California Mastitis Test)

| Sr. No. | Farm | No.of Animals | | No.of Quarters | |
|---|---|---|---|---|---|
| | | Total | Positives | Total | Positives |
| 1. | Dairy Unit at BVC (Cows). | 11 | 7 (63.64) | 44 | 9 (20.45) |
| 2. | Aarey Colony Unit No.22 (Cows). | 25 | 7 (28.00) | 100 | 11 (11.00) |
| 3. | Aarey Colony Unit No.22 (Buffaloes) | 18 | 2 (11.11) | 70 | 2 (2.86) |
| 4. | Cattle Breeding Farm, Kandivali (Cows). | 42 | 16 (38.10) | 165 | 20 (12.12) |
| 5. | Cattle Breeding Farm, Betegaon (Cows). | 56 | 18 (32.14) | 209 | 33 (15.79) |
| | Total | 152 | 50 (32.89) | 588 | 75 (12.76) |

( ) Figures indicate percentages.

Table : 2 : Cultural Examinations of Subclinical Mastitis.

| Total ++ MCMT samples | Culturally positive samples | Efficacy of MCMT |
|---|---|---|
| 75 | 71 | 94.67 % |

Table : 3 : Clinical Mastitis Cases.

| Sr. No. | Farm | No.of Animals | No.of Quarters |
|---|---|---|---|
| 1. | Dairy Unit at BVC (Cows) | 2* | 2* |
| 2. | Aarey Colony Unit No.22(Cows) | 2 | 2 |
| 3. | Cattle Breeding Farm, Betegaon (Cows). | 2 | 3 |
| 4. | Buffalo Stables at Malad. | 8 | 8 |
| | Total | 14 | 15 |

* 1 animal - 1 quarter culturally negative.

Table : 4 : Aetiology.

| Sr. No. | Organisms | No.of Quarters | Percentage |
|---|---|---|---|
| 1. | Coagulase positive staphylococci | 35 | 35 |
| 2. | Coagulase negative staphylococci | 22 | 22 |
| 3. | Haemolytic streptococci | 3 | 3 |
| 4. | Non-haemolytic streptococci | 14 | 14 |
| 5. | *Corynebacterium pyogenes* | 9 | 9 |
| 6. | *Bacillus* spp. | 5 | 5 |
| 7. | *E.coli*. | 3 | 3 |
| 8. | *Klebsiella* spp. | 2 | 2 |
| 9. | Unidentified gram-positive rods | 7 | 7 |
| | Total | 100 | 100 |

* Mixed infections in 15 quarters (17.65 %).

Table-5. "SENSITIVITY RESULTS"

| No. | ANTIBIOTIC → / ORGANISMS ↓ | AM | C | A | CX | DX | FX | GM | N | FD | NY S | NY I | OL | OX | P | BA | S | TE | POVIDONE IODINE: PIVIPOL 1% S | PIVIPOL 1% I | BETADINE 5% S | BETADINE 5% I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Coagulase Positive staphylococci | 19 | 19 | 11 | 25 | 20 | 13 | 33 | 25 | 14 | - | - | 24 | 13 | 5 | 14 | 14 | 10 | - | - | 1 | - |
| 2. | Coagulase Negative staphylococci | 15 | 14 | 8 | 17 | 14 | 6 | 16 | 13 | 8 | - | - | 13 | 9 | 8 | 6 | 8 | 9 | 1 | - | 2 | - |
| 3. | Streptococci | 10 | 8 | 3 | 7 | 6 | 4 | 9 | 7 | 3 | - | - | 6 | 6 | 5 | 6 | 8 | 3 | - | 3 | 3 | 3 |
| 4. | Corynebacterium pyogenes | 4 | 4 | 3 | 4 | 5 | 2 | 7 | 8 | 2 | - | - | 5 | 1 | 4 | 5 | 4 | 1 | - | 1 | - | 5 |
| 5. | Bacillus spp. | 4 | 4 | - | 3 | 1 | - | 5 | 5 | 1 | - | - | 2 | - | - | - | 4 | - | - | - | - | - |
| 6. | E. coli. | 2 | 2 | 2 | - | 2 | 1 | 3 | 2 | - | - | - | 1 | 2 | 1 | 3 | 2 | 2 | - | - | 1 | 1 |
| 7. | Klebsiella spp. | - | 2 | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - | - | - | - |
| 8. | Unidentified gram-positive rods. | 3 | 1 | 2 | 3 | 4 | - | 4 | 4 | 2 | - | - | 4 | 4 | 2 | 1 | 2 | 3 | - | - | - | 1 |
| | TOTAL:- | 57 | 54 | 29 | 59 | 52 | 26 | 78 | 65 | 30 | 0 | 0 | 55 | 35 | 25 | 35 | 44 | 28 | 1 | 4 | 7 | 10 |

** Antibiotic short forms : Pl.see APPENDIX NO. 2

* S = Sensitive

* I = Intermediate.

According to sensitivity results for each type of organism; first three antibiotics were recorded as follows :

Table : 6 : Antibiotics of choice for various organisms.

| Sr. No. | Organisms | Antibiotics | | |
|---|---|---|---|---|
| | | First choice | Second choice | Third choice |
| 1. | Coagulase positive staphylococci. | GM (94.29) | CX, N (71.43) | OL (~~71.43~~) (68.57) |
| 2. | Coagulase negative staphylococci. | CX (77.22) | GM (72.73) | AM (68.18) |
| 3. | Streptococci | AM (58.82) | GM (52.94) | S (47.06) |
| 4. | Corynebacterium Pyogenes | N (88.89) | GM (77.78) | DX, OL, BA (55.56) |
| 5. | Bacillus spp. | N, GM (100) | C, S, AM (80) | CX (60) |
| 6. | E. Coli. | BA, GM (100) | -- | -- |
| 7. | Klebsiella spp. | C, S (100) | -- | -- |
| 8. | Unidentified gram-positive rods. | DX, N, P, GM, OX (57.14) | -- | -- |

* Antibiotic short forms : Pl.see Appendix No.2

( ) Figure shows percentage.

* Five antibiotics of choice for treatment of Bovine Mastitis.

1. Gentamicin - (78 %)
2. Neomycin - (65 %)
3. Cloxacillin - (59 %)
4. Ampicillin - (57 %)
5. Oleandomycin - (55 %)

( ) Figure shows percent sensitivity of organisms to antibiotic.

* Five antibiotics to be chosen as a last resort FOr the treatment of Bovine Mastitis.

1. Penicillin - (75 %)
2. Furazolidone - (74 %)
3. Tetracycline - (72 %)
4. Chlortetracycline - (71 %)
5. Nitrofurantoin - (70 %)

( ) Figure shows percent resistant of organisms to antibiotic.

Table : 7 : Treatment.

| Sr. No. | Antimastitis preparations | No.of quarters treated | No.of quarters cured. | Efficacy % |
|---|---|---|---|---|
| 1. | Tilox-vet | 31 | 26 | 83.87 |
| 2. | Gentavet | 16 | 16 | 100.00 |
| 3. | Lykacetin-S | 7 | 7 | 100.00 |
| 4. | Terramycin | 6 | 5 | 83.33 |
| 5. | Albercillin | 5 | 4 | 80.00 |
| 6. | Mastalone | 4 | 4 | 100.00 |
| 7. | Pendistrin-SH | 2 | 2 | 100.00 |
| 8. | Antrima | 2 | 2 | 100.00 |
| | Total | 73 | 66 | 90.41 |

REPEAT CASES :

Incidence of repeat cases (which did not respond to the treatment) was 13.73 % animalwise and 9.59 % quarterwise ( Table-8).

TREATMENT WITH POVIDONE IODINE :

There was not a single reference available, regarding treatment of bovine mastitis with povidone iodine.

Pankey et al. (1983) tried povidone iodine as a teat dip under experimental challenge to Staphylococcus aureus and Streptococcus agalactiae.

Literature on Betadine (5 % povidone iodine) and Pivipol (1 % povidone iodine) stated that, it could be used in treatment of mastitis. In case of 'Betadine' a dose of 10-20 ml. per quarter as intramammary route was suggested but the course of treatment was not mentioned.

Though the sensitivity test for Betadine and Pivipol was carried out, the treatment was not given on the basis of sensitivity as the test results were not standerdised.

In this study povidone iodine was used in different doses and different durations of treatment. The detail treatment record is presented in Table-9.

MILK YIELD : After the treatment, there was no appreciable difference in milk yield of cattle and buffaloes.

NEGATIVE CASES :

Negative cases at first MCMT; Ist treatment; or later ones (Total 15 cases) were selected randomly and their milk samples were found to be culturally negative.

TABLE-8.

DETAIL RECORD OF REPEAT CASES.

| NO. | FARM | Case No. Quarter & Type of Mastitis. | Ist Cultural Results. | Sensitive To | Treatment with | IInd Cultural Results. | Sensitive To | Treatment with | IIIrd MCMT Results. | Cultural Results | Sensitive To | Treatment with | IVth MCMT Results & Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Dairy Unit at B.V.C., Parel. | $C_{112}$, RF clinical. | Nonhaemolytic Streptococcus +Bacillus spp. | AM,N,C,CX, GM, S. | TILOX | Corynebacterium pyogenes | N,OL,P,C, GM,S,BA. | LYKACE-TIN-S | NEGATIVE | - | - | - | - |
| 2. | Aarey Colony, Unit No.22, Goregaon. | 514,LH, Subclinical | Nonhaemolytic Streptococcus spp. | AM,A,DX, N,P,GM, OX,S,BA. | TERRA-MYCIN. | Coagulase Negative Staphylo-coccus sp. | A,DX,TE, C,GM,OX, BA. | -"- | NEGATIVE | - | - | - | - |
| 3. | Cattle Breeding Farm, Kandivali. | Veena-III LH, Sub-clinical. | Corynebacte-rium pyogsnes | AM,A,DX, N,P,C,CX, GM, S. | TILOX | Corynebac-terium pyogenes. | N,OL,GM, OX,BA. | MASTA-LONE. with Terramy-cin 20ml. I/M-5 days. | POSITIVE (CLINICAL CASE). | Coryneba-ctrium pyogenes | DX,N,OL, TE,CX, GM,OX. | GENTAVET | Quarter dried fibrosed & no milk production. |
| 4. | Cattle Breeding Farm,Betegaon. | Tora-II, RH Subclinical | Coagulase positive Staphylococcus sp. | AM,N,FD, C,GM. | ALBER-CILLIN. | Coagulase positive Staphylo-coccus sp. | OL,FD,C, CX,GM, BA. | GENTAVET | NEGATIVE | - | - | - | - |
| 5. | -"- | Krishna-IV, RF, Sub-clinical. | -"- | AM,A,DX, N,OL,CX, GM,OX,S | TILOX | -"- | OL,FD,C, CX,GM,FX, BA. | -"- | -"- | - | - | - | - |
| 6. | -"- | Vanbala-II RH, Sub-clinical. | -"- | AM,N,OL, P,FD,CX, GM,S,FX, BA. | TILOX | -"- | A,DX,N,OL, TE,FD,C, OX. | MASTA-LONE. | -"- | - | - | - | - |
| 7. | -"- | Asha-III LF, Sub-clinical. | -"- | AM,A,N,TE, FD,CX,GM, OX,FX. | TILOX | -"- & Bacillus sp. | TE,GM (both cultures) | GENTAVET | -"- | - | - | - | - |

* Antibiotics short forms : Pl. see APPENDIX NO. 2.

* Treatment : Pl. see APPENDIX NO. 3.

Table-9.

## TREATMENT RECORD WITH POVIDONE IODINE

| NO. | PREPARATION | Dose per quarter. | Duration | Species & no. | Type of Mastitis. | No.of quarters. | Side effects and/or Results. | After 72 hrs. MCMT Results. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Pivipol | 20 ml. b.i.d. | 1 day | Cows (2) | Subclinical Mastitis. | 2 | Intense irritation observed, on an average 30% milk yield decreased. After 4 to 5 days milk yield came to normal. | POSITIVE | Avoid treatment with povidone iodine in subclinical mastitis in cows. These cases were treated with respective antibiotics after cultural and sensitivity tests and cured. |
| 2. | Betadine | 10 ml b.i.d. | 1 day | Cows (3) | -"- | 5 | | | |
| 3. | Pivipol | 10 ml. b.i.d. | 3 days | Buffalo (1) | Subclinical Mastitis. | 1 | No irritation,no depression in milk yield. | NEGATIVE | Povidone iodine preparations, can be used in treatment of subclinica mastitis in buffaloes. |
| 4. | Betadine | 10 ml. b.i.d. | 3 days | Buffalo (1) | -"- | 1 | Slight irritation but no depression in milk yield. | | |
| 5. | Pivipol | 10ml. o.i.d. | 5 days | Cow (1) | Clinical Mastitis. | 1 | Quarter was dried completely. | - | - |
| 6. | Betadine | 10 ml. o.i.d. | 5 days | Cow (1) | -"- | 1 | -"- | - | Cow was pregant. After parturation milk was completely normal and MCMT negative. |
| 7. | Pivipol | 40 ml. o.i.d. | 2 days | Buffalo (1) | Clinical Mastitis. | 1 | No discharges was observed after IInd treatment. | - | The quarter dried as expected. It was not responding to any antibiotic therapy. |
| 8. | Pivipol | 20 ml. 1st day 10ml.2nd & 3rd day o.i.d. | 3 days | Cow (1) Blood in milk & culturelly negative. | Clinical Mastitis. | 1 | No irritation was observed and bleeding stopped on 2nd day. After 3rd treatment normal milk was produced. | NEGATIVE | It can be used in the cases of blood in milk. |