

Mastitis Control

proper management of herd most important in successful program

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Mastitis in dairy herds can be significantly reduced by proper management.

Mastitis, an inflammation of the mammary gland, is not a specific entity but a name for a disease-complex. Clinical mastitis usually is caused by a combination of bacterial infection and faulty milking practices.

Eight separate bacterial species, potentially capable of causing inflammation of the udder, have been identified as causes of mastitis in California herds. The two most important organisms are *Streptococcus agalactiae* and *Staphylococcus pyogenes*. Major occurrences of mammary infection with any of the other six bacterial types have appeared only as special problems in a few herds.

To control mastitis it is essential to know certain facts about the bacteria most commonly associated with that disease-complex.

Str. agalactiae lives in close association with the udder or milk, and can not survive, except under special circumstances, away from the udder for longer than a few days to a few weeks. This characteristic makes possible complete eradication of this organism from self-contained dairy herds.

When *Str. agalactiae* invades the udder, it usually remains there throughout the life of the cow unless removed by the intramammary injection of a medicinal agent such as penicillin. There are indications that this organism damages the udder by altering the milk in some way so that the milk itself becomes the irritant. It has been demonstrated that leaving the milk in an udder—strippings—infected with *Streptococcus agalactiae* will be followed in a few days by the occurrence of symptoms of mastitis—garget—in the infected quarters, while noninfected quarters remain normal. On the other hand, frequent stripping-out of quarters that have become inflamed, due to activity of *Str. agalactiae*, usually leads to disappearance of symptoms and a return to the production of a visibly normal milk. *Str. agalactiae*-infected cows, therefore, must be milked-out completely at each milking to keep an active inflammation from developing.

Staph. pyogenes differs from *Str. agalactiae* in that it is a tissue invader. Staphylococci produce powerful poisons which destroy tissue directly. Incomplete

milking does not lead to inflammation in udders infected with staphylococci, but conditions which favor tissue stresses appear to be important. Tissue stress can be caused by physical blows upon the udder, by employing too high vacuum with milking machines, and perhaps, by leaving machines on the teats after milk flow has ceased. Tissue stresses occur in the udder at time of freshening, and this might explain the fact that acute gangrenous mastitis—blue bag—which is caused by staphylococci, occurs most frequently in cows shortly after calving.

Both *Str. agalactiae* and *Staph. pyogenes* are shed in the milk from infected quarters, usually at every milking. Milk containing the mastitis organisms will contaminate objects with which it comes in contact such as milking machine cups, milkers' hands, floors and corrals. The organisms may be carried to the teats of other cows by such contaminated objects.

The incidence of mammary infections caused by streptococci and staphylococci increase with age of the cows. Heifers, at first freshening, are generally free of mammary infections. Unless precautions are taken to prevent infection after heifers are placed in the milking herd, invasion of their udders by mastitis organisms soon takes place. As high as 25% of animals have been found infected by the end of their first lactation in some herds. Certain herds in California averaged 33% infection at the end of the third, and 75% or higher in the fourth.

The major effort in a mastitis control program should be directed toward preventing the spread of mastitis organisms from infected to clean cows. Heifers should be milked first, mature mastitis-free cows next, and mastitis-positive cows last. Milking machines must be thoroughly disinfected between milkings. Disinfecting the teats of all cows after each milking is of great value. A chlorine solution of about 250 parts per million of available chlorine is recommended, and must be freshly prepared at each milking period. With a metal cup about 2½ inches in diameter and five inches in depth, a fresh cupful of chlorine solution is applied to every cow and each teat is dipped for its full length.

The milker must be conscious of the fact that germs can survive on his hands

from one milking period to the next. The bacteria also may survive on clothing, boots, milking stools, for many hours, and even days. It is even remotely possible that flies may be responsible for minor spread of the mastitis germs by feeding on infective milk and immediately afterwards feeding on residual milk at the teat openings of clean cows.

Until a dairyman has solved the problem of attaining good herd management, he is not in a position to make best use of information provided by laboratory diagnosis, and of application of specific treatments such as penicillin, streptomycin, and aureomycin. The use of mastitis treatments without regard for recommended control procedures is costly and inefficient. A sound mastitis control program requires first of all an interested and co-operative dairy personnel. Then the other two requirements, a supervising veterinarian, and laboratory diagnosis to identify the type of infection, will help make the mastitis control program successful.

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recorded on a chart which can be interpreted in terms of water-absorbing capacity of the milk solids. Commercial laboratories have confirmed the validity of this test. Experiments are being conducted to discover ways of increasing the absorption value of milk solids.

Studies are also underway to discover the mode of action of milk solids as they affect the baking qualities of bread. The experiments indicate that when milk solids have had the proper heat treatment previous to drying—180° F to 185° F for 20 to 30 minutes—they enter into a structural combination with the flour proteins, but when the proper heat treatment has not been applied the milk proteins do not become an integral part of the structure but can be easily separated from the other dough constituents.

Cleanup operations in dairy plants account for from 20% to 40% of total labor involved in processing. Improved methods of cleaning and sanitizing will not only effect a reduction of labor but should also improve the quality of the products and prolong the life of the equipment. Experiments designed to accomplish these results were undertaken in 1950 in co-operation with the Division of Agricultural Engineering. Apparatus to establish the basic principles underlying circulatory cleaning was assembled and is used in a study of the problem.