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Mastitis: prevention and control. 2. Principles of mastitis control

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Mastitis can be controlled. This article outlines the basic principles of mastitis control in the milking shed.

By F. C. Wilkinson, B.V.Sc., Veterinary Surgeon

Mastitis is a major cause of financial loss in over half our dairy herds. Losses result from treatment costs, milk discarded, permanent loss of milk production, culling, lowering of solids-not-fat content and loss of butter-fat production.

If mastitis can be reduced to a low level then these losses will be small and the cows will be allowed to produce to their maximum. Cows can then be culled for low production alone and rapid advances will be made, especially in herds which record production figures.

That mastitis can be controlled is shown by the following three examples. These herds all had a severe “staph” mastitis problem, although only the owner of herd A was initially worried about the problem. In herd B and C the problem was chronic with only odd cases of acute clinical mastitis, but 20 per cent. and 25 per cent. of the quarters in herds B and C respectively showed signs of hardening when felt after milking.

HERD A—A privately-owned herd milking 70 cows for whole-milk production.

Initial infection—1 in every 3 quarters (33⅓ per cent.).
12 months later—1 in every 20 quarters (5 per cent.).

HERD B—Wokalup Research Station herd of 80 milking cows.

Initial infection—1 in every 3 quarters (33⅓ per cent.).
Six months later—1 in every 25 quarters (4 per cent.).

HERD C—A privately-owned herd milking 60 cows for whole-milk production.

Initial infection—1 in every 3 quarters (33⅓ per cent.).
Six months later—1 in every 8 quarters (12½ per cent.).

Benefits Gained . . .
Benefits gained have been considerable.
- Heifers now calve into these herds and remain free of mastitis.
- Permanent loss of milk production is rare, as odd cases of mastitis are detected early and treated.
- Culling for mastitis is practically eliminated once the original incurable cows have been sold.
Herd C, for instance, still has 15 incurable cows which will eventually be sold over the next 12 to 24 months. In this herd, however, no new cases of incurable mastitis have developed since control measures have been undertaken.

- All three herds have recorded substantial improvement in milk quality.

**PRINCIPLES OF MASTITIS CONTROL**

These herds are using principles which I will outline. These principles can be adapted to almost any milking shed and once they are instigated, they become a routine. They involve:

- a check on the milking machine efficiency;
- optimal use of running water in the milking routine;
- regular use of the Rapid Mastitis Test;
- segregation of cows at milking;
- treatment of quarters as considered desirable; and
- culling of incurable cows when economically practicable.

The dairy procedures recommended are of prime importance and are discussed in detail. Think them over in respect to your dairy.

You are invited to attend one of the organised field days to see the methods demonstrated, and also to discuss methods of installation as they apply to your shed.

**A Check on the Milking Machine**

The milking machine is the most important predisposing cause of mastitis. Unless it is working efficiently and used effectively no mastitis control programme can be expected to be successful.

In the control programmes mentioned above, milking machine faults which have developed from time to time have caused sudden increases in the number of infected quarters. Prompt action to rectify faults has meant that each outbreak has soon been brought under control.

Equipment for checking machines for milking efficiency is available at all Department of Agriculture offices in the dairying areas. Any dairy farmer who wishes to introduce a control programme can arrange for his machine to be checked. Alterations recommended should be carried out immediately and before the programme is commenced.

**Running Water Removes Bacteria**

The main spread of disease-causing bacteria is via the milk from an infected quarter to a non-infected quarter. It is therefore recommended that cows with infected quarters should be milked last, after the non-infected cows, so that the possibility of spread of mastitis is reduced. This segregation will be discussed more fully later in this article.

Unfortunately, no test allows perfect segregation of infected and non-infected cows; therefore efforts must be made to eliminate possible means of carrying infection from one cow to another at milking. The main carrying agents are the teat cups, and equipment used to wash the cows’ udders.

By far the most important spreaders are the teat cups. This has been proved in experimental herds in England where known non-infected cows have been milked after known infected cows using the same teat cups. Subsequently, infection has been found in the previously non-infected cows. However, when the teat cups have been cleansed between cows, the infection has not spread.

This has been confirmed in the trial herds mentioned in this article. In one herd, inefficient teat cup cleansing led to spread of mastitis which was halted once efficient teat cup cleansing was brought about.

Obviously, a suitable method of cleansing the teat cups must be adopted if mastitis spread is to be effectively controlled.

There are two main ways of effectively cleaning the teat cups between cows. They are:

1. Immersing the teat cups in a disinfectant solution so that all milk bacteria are washed into the disinfectant solution and killed.
2. “Back-flushing” the teat cups by passing water through the teat cups and washing the bacteria and milk out of the teat cups.
"Back flushing" the teat cups removes milk—and virtually all the bacteria. About six pints of water are passed through the claw.

The first method has long been recommended but in very few dairies is it carried out satisfactorily. Either the cups are not properly washed or the disinfectant used is allowed to become contaminated and ineffective. If carried out assiduously, it is effective.

Back Flushing

The back-flushing method is one which shows distinct promise and has been used in the three herds mentioned earlier. About 6 pints of water must be passed through the claw, so that it washes all the milk out of the four teat cups. Dairy laboratory experiments have shown that this removes 98 per cent. of the bacteria.

Methods of introducing water at present involve either:

- fitting a Y piece on the milk line where water can be introduced when the cups are off the cow;
- use of an adapted milk claw with a permanent third pipeline through which water is introduced; or
- removing of the milk line at the claw and attaching a water hose.

The first method has two main disadvantages. First, all the milk in the milk line must be washed out, so requiring more water to obtain the same degree of cleaning than if the water is introduced closer to the milk claw. Second, in most sheds the loop formed by the milk line when the cups are hanging must be straightened out to allow all water to drain out, otherwise water will go into the bulk supply when the cups are fitted on to the next cow. For this system to work an air admission hole must be made in the milk line, at the tap.

Adapted milk claws are not yet available; until they are the removal of the milk line and attachment of a hose has been found to be quick and practicable, once the initial period of feeling "all thumbs and fingers" has been overcome.

If the milk hose is fastened to the air line by rubber band it does not fall away on being detached. The water hose and tap can be in a readily-accessible place and quickly attached to allow water to flow while the cups are not in use, or are held for a few seconds in sheds in which the cups are required immediately for another cow.

Before the cups are placed on the next cow the water hose must be removed and the milk line re-attached. During this movement, water in the cups will be drained out.

Plastic hoses are slightly easier to slip on and off than rubber hoses and may save some time if this cleaning method is adopted.

Passing water through the milk claw does not seem to be as much of a problem as making the water flow out of all four teat cups, thus removing all milk and bacteria. This is easily done if cups with sloping teat cup liners are used but with cups having a nut and tail the water tends to enter the teat cup as a solid stream and only washes the teat lining at the mouth end, which is of little use. Lowering the water pressure can decrease this undesirable effect and increase the efficiency of washing, but the milker has to wait longer for sufficient water to flow through.
The use of running water for udder washing is a very effective method of removing bacteria. Massaging to stimulate milk let-down is done at the same time.

In many cases, it is preferable to purchase new cups which incorporate sloping teat liners and which wash out efficiently using greater volumes of water at higher pressures.

**Running Water for Udder Washing**

The use of running water to wash the cow's udder, so cleansing the skin of the teat and stimulating milk let-down is becoming increasingly popular. This is a very efficient method of removing skin bacteria.

If this method is used the only likely carrier of bacteria from one cow to the next is the operator's hand which is used to massage the teats and udder. The hand, however, is being well washed with water and kept relatively free of bacteria. **This method of washing cows' udders is recommended in this control programme.**

The same water supply can be used for washing the udder and the teat cups. The use of water for both these purposes ensures a clean dairy floor when milking, with milk, manure and bacteria washed away rapidly by way of the drain.

**Disinfectants**

If a disinfectant is to be used, it can be applied by means of a cup-size receptacle full of the disinfectant to immerse each teat after washing in running water. By doing this, the disinfectant is not contaminated with foreign matter, and only small amounts are required.

If, in the milking routine, the teat cups are applied immediately after washing and the application of a disinfectant, the disinfectant has no time to kill the bacteria, and is of little use. If a period...
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Collecting samples for the Rapid Mastitis Test. The testing pan is held with the arrow pointing towards the cow's head.

of more than 30 seconds is allowed, the disinfectant will kill a number of the bacteria on the skin and may be of some use. The bucket containing disinfectant may be carried from cow to cow, or buckets can be distributed at convenient places between bails.

The immersion of teats in disinfectant after milking is not advocated as it is an extra task and its value is doubtful. However, if the disinfectant is handy, this step may be included if desired.

Running water at ordinary temperatures appears to have no disadvantages as far as the cow is concerned, but can be uncomfortable on the operator's hands in winter. To avoid this the water can be used after it has passed through the milk cooler.

**The Rapid Mastitis Test**

The squeeze bottle, testing pan and fluid to carry out the Rapid Mastitis Test are readily available and relatively inexpensive. One gallon of testing fluid is sufficient to test between 300 and 400 cows.

Once the farmer becomes familiar with the test he can carry it out rapidly and efficiently and can simply test his whole herd and record results at regular intervals. The test measures the number of inflammatory cells in the milk. Small numbers of these cells are always present and these are not recorded by the test. As the number of cells increases in response to damage in the udder so the test becomes more positive.

The method of testing is:

1. discard the first few squirts of milk from each quarter;
2. hold the testing pan with the arrow towards the head of the cow;
3. take one or two squirts of milk from each teat into the section of the pan corresponding to the quarter of the udder;
4. tilt the pan at a 45-degree angle to drain off excess milk so that equal amounts of milk are in each pan;
5. add an amount of testing fluid equal to the amount of milk in the pan;
6. gently agitate the pan so that the fluid and milk mix and then swirl around in the receptacles;
7. read the result of the test within a few seconds of agitation.

The results are read according to the amount of slime in each receptacle as follows:

- **Negative (0)**—Fluids swirl freely around the edge of the receptacle.
- **Suspicious (1+)**—Most of the fluids swirl freely around the edge of the receptacle, but there is some slime in the centre of the pan.
Segregation at milking time: On the left are members of the "Chain Gang"—those affected with mastitis—waiting to be milked after "clean" cows.

Positive (2+) The fluids rotate as a mass around the pan with an obvious gel formation.

Strongly positive (3+)—The fluids set like a jelly in the middle of the receptacle.

Common faults in carrying out the test are:

1. The foremilk is not removed.
2. There is too much milk in the receptacle.
3. The fluids are not properly rotated in the receptacle, and
4. The reading order of the receptacle is not standard.

All these faults can be overcome with practice, especially if someone can show you how to carry out standard readings.

The interpretation and use of the results of this test will be discussed in the next article.

Meanwhile, farmers who are planning a control programme should obtain a testing kit and attend a field day to familiarise themselves with the reading of the test. The recording sheets offered free by the Department of Agriculture are for the recording of the results of this test, which is essential to the success of the programme.

Segregation of Cows at Milking

Segregation of cows at milking and teat cup cleansing are the most important points in the control programme. Most farmers are apprehensive when one suggests the segregation of cows at milking, but usually a simple method can be found. In the next article, the cows to be segregated will be indicated and, depending on the numbers in the clean and infected groups, so different methods can be used.

Here are some known effective methods:

1. Segregation at a race-way before the cows enter the holding yard. One person stands in the race-way and stops any of the identified "infected" cows from passing. Once all the "clean" cows have passed, they are yared and the gate closed, so that the infected cows wait outside; when the "clean" cows have been milked the gate is opened and the "infected" group may be milked. This method was carried out at Wokalup where two men initially segregated 90 cows in five minutes, into groups of 60 and 30.

2. Segregation by running as two herds. This can sometimes be managed for short periods while feed is plentiful near the dairy, but is rarely practicable for any length of time. Sometimes segregation at the evening milking as mentioned in (1), then running as two groups overnight is possible. This was done in herd C for a short period.
(3) Segregating infected cows by preventing them from entering the bails from the holding yard until "clean" cows have been milked. This method is satisfactory if the numbers to be kept back are small and is a method which can be used once the infected cows get used to coming in last. The main disadvantage of this system is the difficulty in bringing cows in; this can upset the milking routine with resultant interference with milk let down, or it may cause teat cups to be left on too long. This method is now the practice in herds A and B where five or six infected cows always stay to be milked last.

(4) Segregation on entering the holding yards, or even in the holding yards, is often possible. Infected cows can be drafted into a separate yard to be milked after the clean group have been milked. This has been the practice in herd C and in several other herds.

The secret of segregation is easy identification. The most satisfactory method has been to place a light dog chain around the neck of each infected cow, clipped on with a spring clip. Chains can be removed or placed on as required with the development of the control programme. Cows forming this group become known as the "chain gang."

If it is economical and practical to do so, all infected cows which do not respond to treatment can be sold, so avoiding the need for segregation. This, however, is rarely acceptable or economic.

Treatment

The treatment of infected quarters will be discussed in the next article.
Do you want to control
Mastitis in your herd?

HERE'S what to do if you wish to adopt the mastitis control programme to be outlined in the next article in this series:

• Check the efficiency of your milking machine.

• Install running water with a view to washing the cows' udders and cleansing the teat cups.

• Provide one or more buckets for disinfectant, and cup-like receptacles for immersing teats. (Optional)

• Purchase a Rapid Mastitis Test kit and testing fluid and become familiar with carrying out and recording the test.

• Ensure positive identification of all cows so that R.M.T. results can be easily and effectively recorded.

• Order special recording sheets, which will be supplied on request by the Department of Agriculture. (Give name, address and number of cows being milked)

• Purchase a number of dog chains and clips for positive identification of infected cows.

• Provide for segregation of the herd at milking into "clean" and "infected" groups.

The only additional cost, once you have done these things will be treatment drugs.

Once the above action has been taken, the new milking routine can be introduced and be familiar to the operators before the next month's article appears. This article will describe the recording of the R.M.T., and the interpretation of the results, and suggest which cows should be segregated and treated.

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