Progress in mastitis control: a simple control programme that works

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Progress in mastitis control . . .  
"a simple control programme that works"

Intensive Department of Agriculture work on the mastitis problem has resulted in development of a simple control programme that works in W.A. dairy herds. Farmers receive regular advice on their herd mastitis levels, and advice is readily available on overcoming specific problems.

By G. P. Olney, Adviser, Busselton Office, and R. K. Mitchell, Veterinary Officer, Bunbury Office
Mastitis is consistently ranked as the cause of greatest production loss in dairy cows.

The disease in its most severe form is obvious to farmers and is called "clinical mastitis". Fortunately, the worst form, which causes sudden death and gangrene of the udder, is rare. The farmer sees more of the non-fatal form of clinical mastitis in which clots, discoloured milk and hot udders are the main signs.

However, the big cause of economic loss is the widespread "subclinical mastitis". Only tests will detect this form as the milk and udder show no apparent signs of infection.

Bacteria are the common cause of mastitis, and cows become infected mainly at milking time by the transfer of these bacteria in the milking machine teat clusters. Because these bacteria can never be fully eliminated from a herd, we aim for "mastitis control" rather than attempt eradication.

Identifying the problem

For many years, farmers have recognised mastitis as a severe problem in W.A. dairy herds. It was not assessed in detail, however, until the Department of Agriculture began an intensive survey in 1964. The survey of 225 cows in 100 herds found mastitis in 54 per cent of cows, and in 27 per cent of all quarters. (5)

To estimate the cost of mastitis, 25 herds were surveyed more intensively between 1967 and 1969. (6) Quarters with clinical mastitis (signs of the disease) produced 2.75 litres a day less than normal quarters, and quarters with subclinical mastitis produced 0.9 litres less. Clinical mastitis also significantly reduced fat and solids-not-fat levels.

As a result of these surveys, the cost of mastitis to W.A. dairy farmers was estimated to be almost $3 million a year, or $27 for each milking cow.

In 1966 an Australia-wide Expert Panel on Bovine Mastitis estimated the annual cost of mastitis for the Australian dairy industry to be $37 million (1).

Mastitis control in the 1960s

A control programme for mastitis was developed by the Mastitis Committee within the W.A. Department of Agriculture during the 1960s. It was based on
- efficient milking machine operation,
- running water for udder washing, and back-flushing of teat cups,
- segregation of cows at milking, based on the Rapid Mastitis test (R.M.T.),
- treatment of R.M.T.-positive quarters provided the udder was normal and
- culling of chronically infected cows.

The Department of Agriculture's Wokalup Research Station introduced this programme in 1964, and within 12 months, infected quarters (R.M.T. positive) were reduced from 31 to 5 per cent.

A similar programme with four commercial herds reduced mastitis from 20 to 5 per cent. (10)

Based on these results, the Department of Agriculture actively promoted the control programme. As a measure of the success of the promotion, a 1972 survey of 276 dairy farmers showed that 78 per cent washed udders and 51 per cent backflushed teat cups. (8)

However, segregation of cows at milking was not widely adopted. Many farmers purchased R.M.T. kits, but few used them regularly on all cows. Only part of the mastitis programme then advocated was therefore accepted by most farmers. Some back-flushing systems installed were not efficient, so although many farmers did obtain a marked reduction in mastitis levels which they attributed to back-flushing and using running water for udder washing, others did not have the same success.

In 1970 a programme more acceptable for farmers was sought.

More acceptable controls

A simple mastitis control system developed in the U.K. (4) and later in the U.S.A. (9) considerably reduced the level of mastitis. Although many factors seemed to contribute to better control, the main benefits were obtained by
- teat dipping with disinfectant after each milking, and
- treating all cows at the end of each lactation with an effective antibiotic formulation designed specifically for use at drying off.

A pilot control programme had begun in New South Wales, but it also included segregation of cows with mastitis, udder stimulation with soap and running water, and the use of paper towels to dry each cow's udder before milking. (2)

W.A. pilot control programme.

Following the success of these controls it was decided a W.A. pilot programme should test a control system in 20 commercial herds.

In planning the W.A. pilot mastitis control programme it was decided that emphasis would be placed on teat dipping and dry cow treatment, but procedures of less provable benefit that were unlikely to be accepted by most farmers would be deleted. The control measures which became the basis for the W.A. pilot programme were:
- Teat dipping cows after each milking with an iodophor containing 5 000 ppm available iodine.
- Dry cow therapy with an antibiotic formulation* designed specifically for infusion at drying off. All cows were to be treated in all quarters in the first year of the programme, and in the second year treatment of infected cows only was recommended.
- Correct use of an efficient milking machine.
- Milking routine to include adequate stimulation with running water and avoidance of over milking. Efficient back-flushing of teat cups after each cow was considered desirable but not essential. In the programme, 18 of the 20 herds back-flushed teat cups after each cow.
- Rational antibiotic therapy of affected quarters during lactation.

* The formulation used was Orbenin Dry Cow-Beecham Veterinary Products.
Dry cow therapy with an antibiotic to control the mastitis-causing bacteria

- Cows with chronic mastitis to be eventually culled.

This programme was begun between November 1971 and September 1972 in the 20 herds, and each herd was supervised for two years. Before beginning the programme, the Department of Agriculture tested each quarter twice with the R.M.T. and also by culturing milk samples for bacteria to establish the mastitis incidence for each herd. Milking machines were tested for efficiency, and the milking routine of each herd was examined.

Throughout the two year period, the Department of Agriculture examined milk samples from each quarter for bacteria every six months, and used the Rapid Mastitis Test every two months. After the first 12 months of the programme, milking machines were tested, and the milking routines re-examined.

Figure 1 shows the marked reduction in the level of mastitis during the first year of the programme and the further slight reduction in R.M.T. positive quarters in the second year. These results are similar to those of other pilot programmes.

Table 1 shows the financial benefit of the increased milk production from mastitis control. In the first year of the programme, production per cow rose 8.2 per cent above the average for the two years before the control programme, and in the second year, the production was 13.3 per cent higher.

Cost increases were due to teat dipping and dry cow therapy. However the cost of lactation treatment which was the major cost in the two years before the control programme, was markedly reduced.

The net benefits shown in Table 1 assume that all the increase in production was due to mastitis control. This assumption may have been reasonable as the 20 herds in the programme declined slightly in production in the two years before the programme began.

However, this decline may not have continued during the period of the mastitis control programme as herds in the Dairy Herd Improvement Scheme had an average improvement in production of 2.67 per cent during the period of the programme.

Table 1 only includes the benefit of increased milk production but a reduced culling rate for mastitis would also be a substantial benefit. The reduced culling rate means that fewer replacement heifers have to be carried and that there is more potential for herd improvement because the increased opportunity for culling on production.

Everything considered, it is estimated that farmers could expect a net return of $16 a cow each year using the recommended mastitis control programme.

**Mastitis extension in the 1970s**

Early indications of the pilot mastitis control programme were so
Table 1.— Benefits and cost of mastitis control programme

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Average of two years before programme</th>
<th>First year of programme</th>
<th>Second year of programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual milk yield per cow (litres)</td>
<td>3 054</td>
<td>3 304</td>
<td>3 461</td>
</tr>
<tr>
<td>Increase in yield (litres)</td>
<td></td>
<td>250</td>
<td>407</td>
</tr>
<tr>
<td>Value of increased yield at 4.4 cents/litre</td>
<td></td>
<td>$11.00</td>
<td>$17.91</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs</th>
<th></th>
<th>First year of programme</th>
<th>Second year of programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual cost of mastitis control</td>
<td>$1.22</td>
<td>$4.59</td>
<td>$3.18</td>
</tr>
<tr>
<td>Increase in cost due to control programme</td>
<td></td>
<td>$3.37</td>
<td>$1.96</td>
</tr>
<tr>
<td>Net benefit of programme/cow/year</td>
<td></td>
<td>$7.63</td>
<td>$15.95</td>
</tr>
</tbody>
</table>

Backflushing of teat cups after each milking is desirable, but not essential for mastitis control.

Adoption by farmers

To assist in planning further work an indication of the adoption of the control measures was wanted. A survey of mastitis control practices was conducted in 1976 to evaluate progress in extension of mastitis control practices and identify areas where greater emphasis was needed.

Ninety three dairy farmers were randomly selected. This represented 12 per cent of farmers with a minimum of 10 farms in each Department of Agriculture advisory district. The results of the survey are summarised in Figure 2.
Under the new service farmers receive a monthly cell count result of the herd milk measured by the Fossonatic Cell Counter. The Fossonatic gives far more precise results than the previous tests.

The Mastitis Information Service result sheet gives the following information.

- The latest cell count.
- The results of the previous five months.
- The average of these results.
- A comment on the herd mastitis situation.
- A conservative estimate of how much milk production could be increased by better control.
- The relative position compared with all other producers in the State.

Farmers should aim to have the average cell count less than 200 000 cells per ml. The latest average somatic cell count in W.A. is 380 000, well above this target, but low compared with the reported average of other States. (3)

A cell count service has also been included as an option to the Dairy Herd Improvement Scheme. Farmers who take this option receive an individual somatic cell count result for each cow at each test. This helps farmers recognise cows with mastitis, and will help them make better use of production figures when deciding which cows to cull. It could also help in deciding dry cow treatment policy.

**Current mastitis research in W.A.**

**Back-flushing and teat dipping trial**

Both back-flushing and teat dipping are aimed at reducing the spread of mastitis infections but they have never been critically examined together. A trial began in May, 1977, with 48 cows at Wokalup Research Station, each cow having one quarter back-flushed, one teat dipped, one acting as a control, and the other quarter both back-flushed and teat dipped. The spread of the test strain (Staph. aureus strain mexicana), which is inoculated into each teat cup before each of ten milkings per week, indicates an additive benefit of teat dipping and back flushing.

**Somatic cell counting**

The Fossonatic Cell Counter was purchased with the help of Dairying Research Committee Funds primarily to investigate variation in somatic cell count. Milking machine faults are being examined and, in the first trial, excessive vacuum fluctuations during milking did not have any effect on cell count. Pulsator rates and later other machine faults will be examined. Research Station herds are also being monitored to determine other causes of variation in cell count.

(5) Mastitis Committee, Western Australian Department of Agriculture, (1967)—Mastitis in Western Australian Dairy Cattle.