

Controlling high herd cell counts

THIS case study relates to a herd of 600 cows in Africa that had an average somatic cell count (SCC) of more than 700. It highlights commonly encountered misconceptions and problems when farmers try to deal with this on their own.

The herd owner had been trying to manage the cell count for years unsuccessfully. He had bought a cell count tester to try to identify problem cows. He had culled many cows, which had resulted in a short-term drop in cell count, which then started to rise again. *Staphylococcus aureus* was the only pathogen identified from high cell count cows.

Cell count penalties/mastitis economics

The herd had been split into high and low cell count groups, with milk from each going into separate bulk tanks.

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details the measures taken to improve management of mastitis and cell count in an African herd of cows

Cell count penalties were six per cent for the low group and 10 per cent for the high group. Bactoscan penalties were 10 per cent for the high group due to high levels of subclinical mastitis bacteria. At this time, 25 per cent of all milk sold was from the high cell count group with a 20 per cent penalty. In addition, such high cell counts would result in significant production losses. Milk production loss is 2.5 per cent for every 100,000 above a 200 cell count (Table 1).

The owner and the author quantified the total losses from mastitis in this herd and came up with £225,000pa, to include cell count and

Bactoscan penalties combined with the production loss. This did not include the costs of clinical mastitis. The owner thought this figure was quite conservative and the total losses were higher.

Herd background

The 600 Holstein cows were penned in corrals in groups of about 60 cows all year round. The rainy season is between November and March (summer), but rains can be very intermittent, so it is possible to have heavy rain in mid-November then none for another month. Temperatures will vary from 20°C to 35°C by day, while in winter, night temperatures can fall as low as 4°C. It is very unusual for cows to be housed in cubicle sheds in this type of climate. All data was manually recorded in numerous books on the farm. There was no farm computer, so it was

impossible to carry out a detailed analysis as we frequently do using computerised programs. The farm did, however, put the individual cell count results into a computerised spreadsheet so you could see the variation for individual cows on a month-by-month basis.

The herd was milked three times a day through an old 16x16 herringbone parlour. Milking took an average of four hours, so this machine was running 12 hours a day. In the rainy season, when the cows came in with exceptionally dirty teats, milking took six hours, so the machine was running for 18 hours a day.

There was a lead milker in the parlour and four other milkers to each look after four milking units. In addition, a milk recorder recorded the yield of every cow at every milking throughout the year. Africans love recording lots of information, and there were books and ledgers detailing all this data going back decades.

Clinical mastitis was not a major problem in the dry season, with an average of one per cent to two per cent of cows having clinical mastitis each month. However, in the previous year there had been more than five cases of gangrenous mastitis, commonly associated with *Staph aureus*, and these cows were shot.

In the rainy season, when cows would be living in corrals under horrendous conditions at times, levels of clinical mastitis could increase to as high as five per cent to eight per cent of cows each month. This is unsurprising as on some days there could be as much as four inches of rain, which makes corral management almost impossible.

Cell count distribution

Individual cell count data showed 45 per cent of cows had cell counts of less than 200, so would be classified as free from subclinical infection. Nineteen per cent of cows had cell counts of more

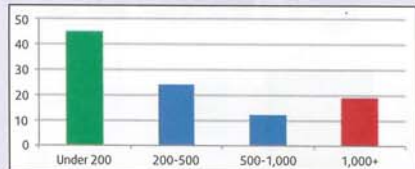


Figure 1. SCC distribution at start of investigation.



Figure 2 (above). In herds with very high levels of *Staphylococcus aureus*, all steps must be taken to minimise cow-to-cow spread.

Figure 3 (inset). *Staph aureus* will thrive on a dry teat like this. A quality post-dip will improve teat condition rapidly.

Author's approach to resolution

To resolve the problem, the first step was to sit down with the owner and the farm manager and explain the basics of subclinical and clinical mastitis. The epidemiology of *Staph aureus* and the steps needed to be taken to reduce the herd cell count were also explained. This focused on the risks of spread in the milking parlour to protect the low cell count cows and the need for culling of the chronics.

Management of subclinical mastitis

There was a lack of understanding about mastitis in general and little understanding about the epidemiology and difficulties in managing *Staph aureus*. There was also a belief you could treat high cell count cows using a week's treatment of Japanese peppermint oil rubbed vigorously into the udder – and that this was successful. This was based on California Mastitis Test (CMT) results after treatment.

The high cell count cows were then tested weekly using the CMT and when they had two low CMTs they returned to the low cell count group.

An indication of timescale was included, which would be greatly influenced by how quickly the owner was prepared to cull many of the chronically high cell count cows. This is always difficult in a herd like this as the owner tries to balance cash flow from milk sales with reducing cell count penalties. However, the owner was well aware many of the high cell count cows would have proved unprofitable and the reservoir of infection for others in the herd.

Milker training and milking routine changes

Staph aureus is spread in the milking parlour, so the most important people to minimise spread are the milkers. The milking routine was modified so milkers wore gloves, which they rinsed between each cow (Figure 2). Cluster flushing was introduced; the importance of effective post-milking teat disinfection and mastitis detection was explained. Milkers were made fully aware of the epidemiology of *Staph aureus* and the importance of their job in minimising any risk of spread of infection. These were all demonstrated in the parlour, then



Figure 4. Worn liners will greatly increase the spread of *Staph aureus* between cows. This liner had carried over 8,000 milkings.

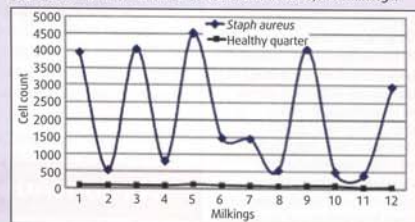


Figure 5. Herd cell count distribution showing per cent of cows in cell count bands.

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References:
1. OIE Expert Surveillance Panel on Equine Influenza Vaccine Composition, OIE Headquarters, 4 March 2013. Available at: <http://www.oie.int/ourscientific-expertise/information-and-recommendations/equine-influenza/> (accessed August 2014).
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the milkers had to demonstrate this back to the rest of the group. Training Africans is great fun as they have a phenomenal sense of humour and are really keen to learn. You need to introduce a set routine that does not change, so there is consistency.

Post-milking teat disinfectant solution

One of the common problems in Africa is supply of products. An iodine solution was being used for this herd as a post-dip, which transpired to be intended for disinfection of utensils. This explained the poor teat condition (Figure 3). Eventually, a quality post-dip was identified and used.

Post-dipping will reduce the new infection rate by about 50 per cent. The disinfectant solution they had been using would have been relatively ineffective and might have reduced the new infection rate by about 20 per cent. The importance of this was highlighted to the manager, who initially complained about the additional cost of a proper dip solution.

Milking machine liners

The author worked out milking machine liners were changed every 8,000 milkings. These need to be changed three times more frequently and this created significant resistance from the owner, as it would add significant additional cost. Time was taken to explain *Staph aureus* can be spread to the next six to eight cows through a normal liner and the risk of this through a worn liner would be significantly higher. Liners would be the major factor for *Staph aureus* once milkers started wearing gloves. In addition, milking with worn liners would slow down milking and decrease yield.

The manager did point out that milking time was reduced by about half an hour when new liners were fitted (Figure 4).

Grouping of cows

Grouping of cows was an area that caused significant confusion. Many cows from the high cell count group were returning back to the low cell count group after a couple of negative CMT results. The owner was unaware of the limitations of the CMT, where there can be significant operator error and variation. Often, positive changes are only seen when cell counts are more than 400 to 500.

We went through all the cows in the herd and set up new high cell count groups with rules that any animal in a high cell count group stays there until the end of lactation. However, in a herd such as this with many groups of cows, you have to expect high cell count animals to escape into low cell count groups.

The author is always amazed when looking at programmes that clearly identify cow movements how many cows move from one group to another daily. Milkers would not know which animals should be in which groups.

The author recommended the high cell count cows were clearly identified using red tail tape, leg bands or any form of permanent marking, so if they ended up in the wrong group they could be quickly returned. Unfortunately, the herd manager was reluctant to do this initially as he was convinced cows would not move between groups. Tail tapes started a year into the control programme.

Management and treatment of high cell count cows

The author could see no benefit from carrying out weekly CMTs and any treatments using Japanese peppermint oil on high cell count cows. It is well known there is significant fluctuation in cell counts from one milking to the next with *Staph aureus*. We also know treatment success for chronic *Staph aureus* cows will be minimal. The herd team was hanging on to the hope some of these treatments would prove successful (Figure 5).

The herd team was not prepared to stop these practices initially, but six months into the programme they stopped. They now look back and joke about how ineffective these practices were.

Antibiotic dry cow therapy

All cows received an antibiotic dry cow therapy; however, a penicillin-based product of questionable origin was being used, as it was the cheapest on the market. We know many strains of *Staph aureus* are resistant to penicillin, so it made sense to use a quality product. It was recommended to use a branded cloxacillin dry cow therapy containing high levels of antibiotic, even though this was costing twice that of the current product. High cell count cows in lactations one to three were dried off early to try to maximise cure rates and minimise the risk of spreading infection.

Machine cleaning

A poor wash up routine after milking, combined with worn liners, meant there would have been *Staph aureus* remaining on the liners at the beginning of each milking. The wash up routine was totally inadequate and there was no disinfection cycle. This was quickly modified and reduction in Bactoscan was quickly seen.

Culling

A list of old chronic high cell count cows was drawn up and these were to be culled from the herd as soon as practi-

cally possible. The majority of these cows were in lactations four and above, with persistently high cell counts carrying over from one lactation to the next. Unfortunately, due to the severity of the problem, there were more than 150 animals on this list. The owner was reluctant to cull lots of cows quickly as he was concerned about cash flow. Many remained on the farm for a subsequent lactation, which slowed down long-term progress in reducing cell count.

Milking machine

The author tested the milking machine and found it had very poor vacuum reserve. When you leaked air in through two units, the vacuum level dropped by 8kPa and took five seconds to recover, and with

three units, the vacuum level dropped by 18kPa and took 10 seconds to recover. Many of the vacuum lines were taped up to prevent leaks. The pulsation performance was poor.

Overall, this milking parlour had passed its best and urgently needed to be upgraded or repaired. Unfortunately, farm finances meant this was not possible. However, one-and-a-half years later, the machine was totally upgraded and milk production increased by one litre per day, while milking time reduced. The owner was delighted – he wished he had made these modifications much earlier.

Computerisation

The herd bought a cattle production and health recording system to manage all the farm data. This now gives inval-

uable data on which to make sound management decisions. The owner is really pleased.

Current herd situation

Eighteen months on and after follow-up visits and advice, 90 per cent of all milk sold has a cell count of lower than 250, with no cell count or Bactoscan penalties. The owner has been culling cows slowly, but still has 10 per cent that need to be removed from the herd. The milk from these cows results in a 20 per cent milk price penalty for this quantity of milk. The owner is aware there is a risk in keeping these cows – especially when they mixed with the main herd for three weeks when he was on holiday and no one picked up on what had happened.

From an economic point of view, the owner estimates

he has clawed back more than £90,000pa in reduced penalties, plus increases in production, giving a very substantial return on investment. He is delighted – especially as his milk buyer has just dropped the threshold where it penalises for high cell counts from next year and he is well under his band.

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