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Technical and human influences on udder health and work quality

The influences on udder health and milk let-down by atomisation of the milking procedure towards increasing labour productivity is investigated using milk flow curves and quarter foremilk sampling.

Among other traits decisive for economic success in milk production is the rapid and complete removal of milk from the udder. Necessary for this is udder preparation which stimulates milk let-down and gets the cow ready for milking. For sufficient manual stimulation labour input of about 60 seconds is required [1]. This expenditure in time does not, however, fit-in with the striving for ever-higher throughput of cows per hour and milker.

For this reason many farmers utilise mechanical stimulation aids and cluster removal for easier and more rapid work. At the same time, this part-atomisation of the pre and post milking tasks should offer an improvement in udder health because the techniques feature a repetitive sequential action which the cow can get used to, whereas the human always varies something in his or her working sequence.

A further step in lightening the human workload is the application of AMS. Here, the human factor is completely omitted of the manual milking operation; all the actions before, during and after the milking are completely automated. From this, too, one expects a positive effect on udder health. However, the monitoring of udder health takes place in an insufficient way via the measuring of milk conductivity [2, 3].

Data recording

As part of the trial four practical farms with parlours from different manufacturers and of different types were investigated. All animals on all these farms had milk flow curves measured via LactoCorder. Additionally a milking protocol was completed for every recording which included the blind milking times for every quarter, the udder form and the behaviour of the cow during the milking. At the same time, foremilk specimens were taken aseptically from each quarter of all lactating cows and these were zytobacteriologically analysed.

Additionally, on two farms with Lely Astronaut AMS, recordings were take from all milking cows every three months via LactoCorder. Here too, aseptic quarter foremilk samples were taken from the lactating cows.

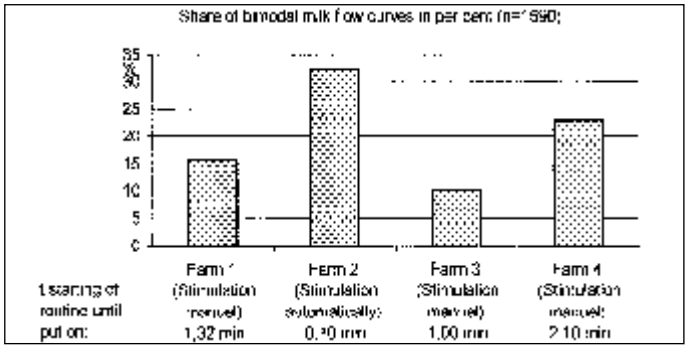

Fig. 1: Share of bimodal milk flow curves in %

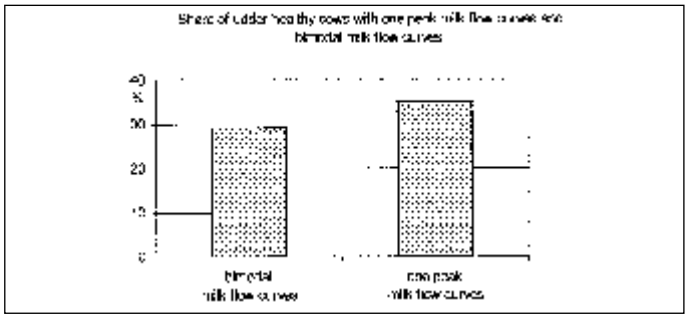

Fig. 2: Share of cows with healthy udders with unimodal and bimodal course of milk flow curves

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Keywords

Milk flow, blind milking, udder stimulation, udder health

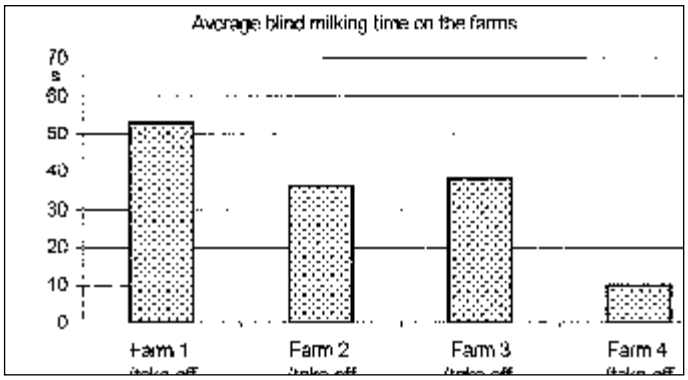

Fig. 3: Average blind milking times

Results

The farms differed substantially with regard to the proportion of bimodal milk flow curves (*figure 1*). The highest proportion (32%) was determined on the farm that stimulated the udder mechanically by vibration. On average, the time required here for stripping foremilk, cleaning the udder and attaching the cluster was only ten seconds.

The farms with manual stimulation had on average a lesser proportion of bimodal milk flow curves. On all three farms manual stimulation took place together with the foremilk stripping and the cleaning of the teats and udder. The attachment of the cluster took place only after a waiting period during which the neighbouring cow was stripped and cleaned. The farm taking the longest time from the beginning of the routine to cup attachment (2.10 mins) also had the highest proportion of bimodal milk flow curves (23%). The smallest proportion of bimodal milk flow curves could be found on the farm where the udder was manually prepared and recorded exactly a minute for the average time between the beginning of the routine and cluster attachment.

The effects of the bimodality on udder health could be seen from the quarter foremilk samples (*figure 2*). From the animals that showed a peaked milk flow curve, 35% had healthy udders. On the other hand, the proportion of udder-healthy animals showing bimodal curve forms was only 29%. Basically, the quarters and udder can be termed healthy when they have a cell count of under 100,000 cells/ml [4]. Quality and health is already recognised as negatively effected when the cell count is between 100,000 and 200,000. A cell count over this must be described as unhealthy.

In order to avoid blind milking through work overload of the milker, three farms apply milk flow operated cluster removal systems. However, only on one farm was the blind milking time reduced by 10 seconds on average by this (*figure 3*). On the other two farms the average blind milking time with the automatic cluster removers was 36 and 53 seconds; in comparison, the average blind milking time in the parlour without automatic cluster removal was timed at 38 seconds on average. Because of the recording results, the automatic cluster removers were readjusted on the farms so that shorter blind milking times were able to be achieved. Such lack of automatic cluster removal precision was confirmed by the HVL Hessia [5].

According to the system applied by the Lely Astronaut, each quarter is milked individually and, through operation according to milk flow, the cups are also individually removed. Here too, the measured values as well as the observations showed in the beginning relatively high blind milking times (*figure 4*). And within this, large differences were also found between the individual quarters. The blind milking time of the quarters varied during the first measurements between 18 and 26 seconds, whereby the removal of the teat cups should have taken place here when there was a milk flow of 50 g per minute and quarter, according to manufacturer recommendations. Because of such relatively long blind milking times, the threshold flow value for the removal of the cups was raised in the following months and the measuring equipment readjusted several times. Thus the blind milking period could be reduced to the very short time of seven to twelve seconds.

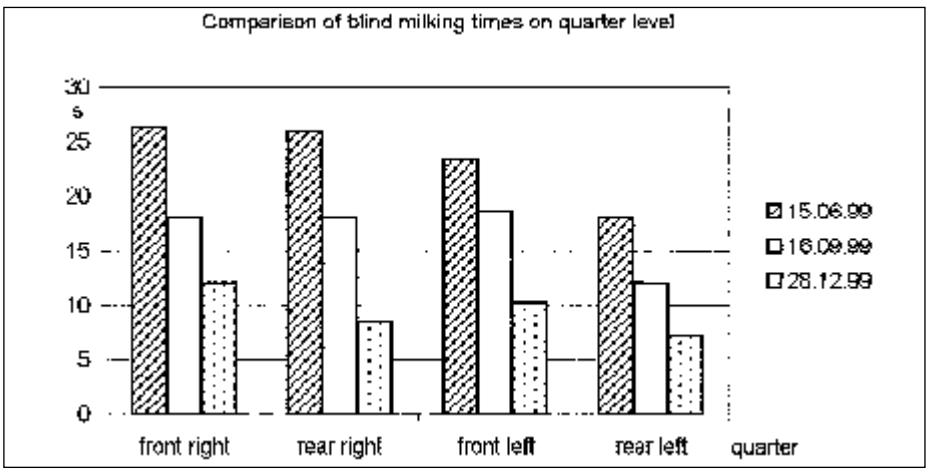

Fig. 4: Comparing milking times for each quarter

Conclusion

The application of technical aid methods towards increasing work quality in the parlour can have a positive effect on udder health. Pre-requirement here is, however, the perfect working of the technology and its precise adjustment, otherwise such aids can have a negative effect and lead to udder health problems.

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