



Cow behaviour and milk let-down

1. Introduction

Efficient milk harvesting requires the cows, people and facilities to be interacting smoothly. This Quick Note discusses how an understanding of cow behaviour can make the milk harvesting process quicker and easier through improved milk let-down.

2. Interpretation and relevance to Australian conditions

When a cow's behavioural and sensory characteristics are understood, handling becomes easier and the milking process can take advantage of the natural milk ejection reflex. Cows that enter the shed calmly and voluntarily are more likely to have had an effective milk let-down by the time the teatcups are attached.

3. Relationship to CowTime goals

A poor understanding of cow behaviour and milk let-down causes a number of problems for both dairy farmers and dairy cows. Fearful cows are more difficult to handle, increasing the amount of handling required during milking and the likelihood of lameness or injury. This increases the time required, and the difficulty of the milking task. Stressed or agitated cows suffer a decrease in milk yield, quality and welfare.

4. Features of cow behaviour that are important for milking

Sensory characteristics

Cattle greatly rely on sight and have wide-angle (almost 360°) panoramic vision. Although they can see depth reasonably well, they may need to stop and lower their heads to judge the depth of steps or gutters. Cattle have a strong tendency to move from dimly-lit areas to more brightly-lit areas, but will not approach very bright light. Shadows and sparkling reflections will cause baulking.

Research has shown that loud noise disturbs cows, but sounds of people yelling or whistling are more stressful than sounds of clanging gates. Cattle will avoid places containing urine from stressed animals.

Social behaviour

Cows need to maintain social space and their orientation. This, combined with their following instinct, makes it important to allow enough space for cows to follow one another and to maintain visual contact with the leader.

Learning

Cows have good short-term and long-term memories and this can be used to develop handling routines. Studies show that cows can learn and adapt to new situations. This can be achieved by initially allowing the animals to move at their own pace and to minimise any fearful experiences along their route. If a cow's routine is constantly changed (such as order of entry or position in the dairy) a cow is not able to learn her routine. This will heighten their sensitivity to fearful experiences and can sensitise the animals to be fearful to the people or facilities. After an unsettling experience it is a good idea to reward the cow with a scratch or a feed.

Fear

Fear is a very powerful emotional state that can be triggered by unfamiliar sights or sounds, heights, danger signals from other cows in the herd and previously remembered experiences. Fearful animals are the most difficult to handle. Cows that are already fearful of the environment and the handler are likely to show exaggerated responses to handling.

Fear of Humans

Cows learn to fear humans if handled badly and they also associate this bad handling with the place where it occurred, for example the milking dairy.

Fear of Novelty or Unfamiliarity

Because cows are initially afraid of sudden changes in their routine, such as lighting, floor surfaces or levels and fence or wall types, it is important to keep these features as consistent as possible to reduce the fear factor. If animals do become fearful in these situations, try to allow them some time to familiarise themselves with the environment.

Fear of Evolutionary Threats

Cows have an in-built sense of fear to avoid life-threatening situations and can interpret some relatively common situations as threats. These include a fear of heights, sudden movements, threatening or aggressive actions, prolonged eye contact and large or towering objects. These threats can be minimised through good dairy design and thoughtful handling practices.

Learned Fear

Previous bad experiences are remembered and a similar situation or location may initiate a fearful response.

Milk let-down

Milk let-down (ejection) is the natural process used by the cow to help remove milk from the udder. This process is brought about by the release of the hormone oxytocin from a gland at the base of the brain, following a suitable stimulus being received by the cow.

The stimulus may be visual, heard or felt and should be predictable and consistent at every milking. Most importantly it should not induce fear in cows. It is commonly thought that genetic selection has ensured that most commercial cows will let-down freely without physical contact with the teats. Handling of the teats however, is a strong stimulus for let-down with research showing that at least 15 seconds of massage per cow is required to effect an appreciable change in milking characteristics.

After release, oxytocin travels through the blood stream and has a direct effect on small muscle cells that surround the milk-producing cells in the udder. Oxytocin causes these muscle cells to contract and squeeze the milk into the milk ducts and so towards the teat. The pressure of the milk being forced into the ducts and down towards the teat causes the teat to swell with milk and become 'plump' with milk. It takes between 60 and 90 seconds for the teats to become plump with milk after let-down has been initiated.

Effect of fear on milk let-down

Although the release of oxytocin is a 'reflex' action, the mental state of the cow impacts on its success. Relaxed cows have an uninterrupted let-down of milk. Agitated, fearful or stressed cows may have a disrupted oxytocin release. Furthermore, adrenaline (a hormone released by fearful cows) directly blocks the action of oxytocin on the udder for 20-30 minutes.

5. Potential challenges with implementation

Cows take time to change their behaviour if they have learned to respond in a certain way to a particular situation. Likewise, it will take some time before cows feel comfortable again after the bad influence has been removed from their environment. The time required will depend on the degree of fear that the bad influence induced. An initial change in behaviour may take 3-4 weeks, with further improvements expected over time. A positive environment must be maintained consistently to maintain the benefits.

6. Robustness of this information

This information is based on extensive dairy cow behaviour studies. There are some gaps in the knowledge, but studies on other species are relevant.

7. References and further reading

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CowTime Guidelines for milk harvesting - Chapter 2, edited by Klindworth, D. et al (2003). Available on the CowTime website www.cowtime.com.au

Quick Note 1.2: Cow handling – interactions between people and cows

Quick Note 3.1: Designing for better cow flow

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