

Keep it cool reduce cow stress

by Karien Slabbert



Modern, intensive farming methods and breeding techniques that aim to ensure increased production and high yields, are collectively stressing dairy cows more than ever. Research has indicated that knowledge and awareness of stress-causing factors on dairy farms can have a profound influence on herd health, as well as milk yield.

Comfortable, relaxed and healthy cows that are subjected to the least amount of stress, are more likely to thrive. Dairy producers should strive to develop an environment that resembles the natural environment – yet allows for the efficiencies required in today's dairy business.

Cow comfort can be regarded as the degree of stress – or the lack of stress – related to all the environmental and physiological factors that compel the animal to change or adapt. A stressed animal struggles to adapt to the prevailing conditions. The term “cow stress” can be applied to physical discomfort, social confrontation within the herd, poor management practices, as well as environmental stressors. Environmental conditions cows are subjected to, such as temperature stress, long walking distances, mud stress and stress caused by insects, may potentially trigger production and reproduction problems, as well as health problems, such as laminitis and mastitis.

Environmental stressors

Climate conditions: Environmental stress can take on a number of forms. One of the most common environmental stressors dairy farmers encounter during this time of the year, is heat stress. Heat, during the warm summer months, and cold winds, during the winter months, play a fundamental role in the animal's performance. Cows are homeothermic animals that need to maintain a constant body temperature as close as possible to 37,5°C-38,5°C. Within this range, no additional energy is needed

to heat or cool the body. Any substantial fluctuations in body temperature can cause severe stress.

Heat stress: Heat-stressed cows spend hours standing and panting, rather than eating or lying down and ruminating. Decreased milk production and poor reproductive performance usually accompanies heat stress. There is also an increase in health problems, such as laminitis and mastitis. Additionally, heat stress negatively influences the udder health status of milk cows, with a corresponding rise in the somatic cell count of milk. The economic implications of heat stress are enormous.

Cold weather stress: Similarly, in winter, protection from the cold weather is as important as protection from the heat in summer. Once again, when temperatures fall, cattle are required to utilise more energy to maintain body temperatures.

Mud and drought stress: Other environmental stressors include excessive rainfall or drought. During periods of excessive rainfall, mud accumulation can become a problem – especially in high-traffic areas. Dry conditions create a whole host of problems. One obvious effect is a reduction in the availability of forage, which creates nutritional stress. Other stressors include increased dust production, which can increase incidences of respiratory illnesses.

Long walking distances: When a dairy cow is walking, she is working. The distance a cow walks daily to and from the milking parlour, together with wet conditions and abrasive surfaces, can increase the risk of lameness. Farmers should look at strategies to cut down walking distances and try to house cows as close to feed, water, shade and the milking parlour as possible. This positive move will ease the cow's workload and allow her to use more energy to dissipate heat and produce milk.

Stress caused by insects: Flies, lice and other insects have immense health implications among ruminant animals. The housefly is able to utilise many of

excrement and fermenting organic material. It has been implicated in the transmission of numerous parasites and diseases. Flies have the annoying habit of landing on the face and probing the eyes and nostrils of the host and are particularly bothersome to cows. This constant annoyance can cause a cow's stress level to rise dramatically.

Lice are serious wintertime pests and are extremely injurious to livestock. Cattle lice infestations are easy to recognise, as lice may climb about on the host's facial hair. Gray-coloured patches appear on cows' heads, necks and shoulders. Lice help create open sores that can provide entrance for infectious agents. Cows may become nervous and edgy as they rub against objects in an attempt to relieve itching.

Poor management practices

Inadequate feeding space and feeding management: Narrow alleyways and overcrowded spaces, with a high level of cattle traffic, can cause a cow's stress levels to skyrocket. In the increasingly confined space of the modern dairy operation, "social confrontation" is often problematic. Narrow feed alleys are a common cause of social discomfort. One study found that aggression among housed cows was four times greater than animals in pasture.

Poor feeding management, such as feeding systems, feeding strategies and ration ingredients, can place enormous strain on animals. This can lead to reduced milk production, reproductive efficiency, and poor herd health.

Poor stall comfort (housing facilities): Cows have a strong motivation to lie down. When more than 20-30% of cows remain standing during normal periods of rest, it can indicate that the stalls are not comfortable.

Another clear indication of cow discomfort is patches of rubbed-off hair and injuries to necks, hocks and knees. These are signs that cows rub excessively on stall partitions and neck railings, when rising or lying down. Neck and hock injuries are common in herds with badly sized or improperly designed stalls. Injuries associated with improperly maintained free stalls place considerable stress on cows, reduce milk yields and increase the risk of mastitis.

Cattle housed in wet, manure-contaminated areas are more likely to suffer from infectious foot

diseases, which place a huge amount of strain on the animals. Several studies have established that cows that stand for long periods have poorer foot health than those who spend more time lying down.

Cows that walk slowly and timidly, with their rear feet spread wide, could be a sign of poor traction. Abrasive flooring surfaces that prevent cows from walking, standing or mounting other cows naturally, dramatically intensify cows' stress levels. All walking surfaces should be skid-resistant to reduce injuries, increase mobility to feed, water and resting more milk than a cow in less than desirable stall conditions.

Overstocking: Overcrowding results in behavioural risk factors that can cause injury, due to slips and falls. Signs of cow discomfort and subsequent stress include when cows lie backward in stalls and alleys, constantly avoid certain stalls, or are only able to partially fit into stalls.

Cow handling: It is a well-known fact that rough handling and stress is detrimental to dairy cattle. In many cases, stress caused by improper handling, can have long-term behavioural effects on the animal. Shocking a cow or hitting her can reduce milk yield by 10%. Cows tend to develop fearful memories that are linked to either negative places or prominent objects. Cow handlers' lack of knowledge, training and awareness has a weighty influence on stress levels in the milking parlour and housing facilities. Even simple activities, such as walking or driving through the herd on pasture can produce evidence of stress-related responses.

Nutritional stress

Nutritional stress occurs when inadequate nutrients are provided to meet the animal's needs. This can include dry matter intake in general, as well as protein, energy, mineral, vitamin or even water intake. Providing inadequate levels of protein and energy always reduces performance and is stressful to the animal.

Parlour routine

Correct and properly managed routines in the parlour are of utmost importance. A proper routine will help tremendously in milking out cows completely. Anything outside normal routine parlour practices will lead to escalated stress levels among cows, and under-milking is usually

the result. Many negative factors can disturb the daily routine, for example:


- ▶ Faulty settings of the milking machine, such as the teat-end vacuum, or problems related to pulsation and vacuum levels
- ▶ Abnormal noises. Cows are more sensitive to high-frequency noises than humans are. Human voices alarm and unsettle cattle more than other sounds. Playing music in the milking parlour provides a steady background of sound. When there is no background sound, cows tend to react to every sudden background noise.
- ▶ Changes in milking times
- ▶ Changes in the handling of the cows prior to entering the parlour
- ▶ Stray voltage (a cow reacts negatively to any stray voltage higher than 2-5 Volts)
- ▶ Non-regular visitors to the parlour.

Social confrontation and isolation

Cows are herd animals and become highly stressed when they are separated from their herd-mates. Nonetheless, if cows are housed with high stocking densities, activity levels are altered. Subsequently, cows are forced to invade the "personal space" of their immediate herd mates.

This increases the underlying incidence of aggression. Crowding in narrow passageways also increases aggressive confrontations, because subordinate cows cannot express submission. These confrontations result in hoof damage – especially if the surface is abrasive.

As cows consume large amounts of dry matter and water, they need unobstructed access to feeding troughs. Dominance among cows occurs because of competition for available resources. To eliminate social confrontation, provide 5% more bunk and stall space than the amount of animals. Also provide at least one water source for every 20 animals. **DMA**




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Proper housing facilities for calves (Part 1)

by Rykie Visser, export and regional manager: DeLaval

One out of every five dairy animals in the milking herd must be replaced yearly by a heifer to maintain herd size and to keep productivity high. Often the housing facilities used for raising dairy replacement calves is the poorest on the farm.



Look after your calves, they are the future of your dairy

The most critical period in raising a calf is in the first six weeks of its life. The environment in which the calf is raised, has a strong influence on its health and growth rate. Almost any housing arrangement is suitable, as long as it is clean, dry, and there is no wind (drafts). It must be good enough so that you can look after your animals properly.

Calf housing requirements

Regardless of the number of calves and whether they are raised or purchased, housing requirements are basically the same. Good calf housing facilities should be in a completely separate area, away from the main dairy. They should also have pens that are clean, dry, free from drafts and well-lighted.

The best conditions for calves are a temperature of 15-25°C and a relative humidity (the moistness of the air) of 65-75%. A good housing facility also have enough space for the storage of feed, bedding and supplies, and must be made of materials that are strong and easy to clean, especially in the area where the youngest calves are housed.

Feeding facilities

Feeding and watering facilities in calf houses should be strong and easily cleaned. To minimise feed wastage, there must be enough space, and calves must be able to reach it easily. The feeding area should be clean and dry to make it easier for you to work in and keep bacteria out.

Utility area

A service and utility area should be provided close to the calf housing area and must be easy to reach. The utility area is used to mix and prepare feeds, to clean feeding utensils, store supplies and should include most or all of the following facilities:

- ▶ Hot and cold water under pressure
- ▶ Drain facilities connected to an appropriate disposal facility
- ▶ Wash tubs or sinks for washing and sterilising feeding and watering utensils
- ▶ Drain and storage racks for utensils
- ▶ Cabinets for storage of supplies
- ▶ Refrigerated storage for pharmaceutical supplies
- ▶ Frozen storage for colostrum.

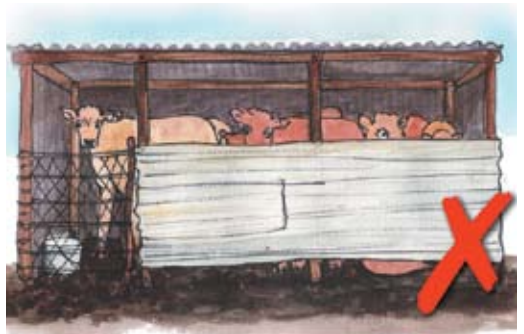
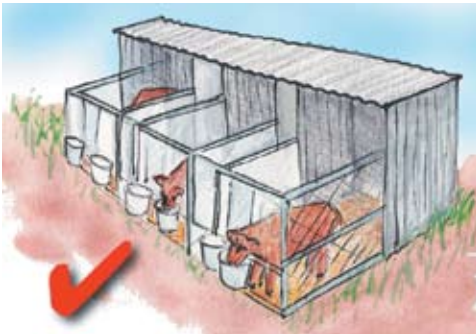
If you need more information on calf rearing equipment or any milking machine needs, e-mail Rykie Visser at rykie.visser@delaval.com



Checklist for calf housing

The housing facility must be in a separate area, away from the main dairy.

- ▶ **Pens:** must be big enough, clean, dry, free from drafts and well lighted. Temperature: 15-25°C. Humidity: 65-75%.
- ▶ **Feeding and watering troughs:** should be easy to clean.
- ▶ **Storage space:** for feed and bedding.
- ▶ **Service area:** to prepare feeds and clean utensils. It should include hot and cold water, drains. **DMA**



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Ultralam®: a strategy of total support

Ultrapak, the South African owners of the well-known Ultralam® milk sachet film, attribute their long-term stability and dominance in Africa's sub-Saharan milk sachet market to two overriding factors. The first is the ongoing development of a superb product and the second is the infrastructure and relationships that support it.

Total support

"Our latest advertising campaign is all about total support," says managing director Monty Munstermann, "We believe that fulfilling client needs is the reason why Ultralam® has grown to an 85% market share in South Africa alone. Not only is the product underpinned by some superb technology; we are also willing to go the extra mile. The milk industry can sometimes be very tough for producers. Ultralam® is one area that they don't need to worry about."

Product

According to marketing director, John Willmers, "Ultralam® has been developed with the African continent in mind. We have created a sachet film with the widest possible sealing window, and with the lowest leaker rates in the industry. We understand that our product has to run on different machines under varying circumstances. Therefore, we have designed it to maximise consistency and reliability. It is tailor-made for African conditions."

For 20 years, Ultralam® has been a benchmark for quality. Most form-fill seal manufacturers recommend it, and the product has been developed to protect milk from the effects of ultraviolet (UV) light. In addition, the seal integrity is so good that it will support the weight of a fully-grown man.

While Ultralam® is primarily associated with milk packaging, it is also suitable for many forms of liquid packaging – especially fruit juice.

Infrastructure

Ultrapak has developed a core competency in the milk

sachet market due to an almost exclusive focus on the dairy industry. A great deal of this expertise comes from a detailed knowledge of the market, the clients, the equipment used and the everyday challenges that all milk producers face.

Simply put, Ultrapak understands that cows need to be milked on a daily basis and that the international dairy industry needs year-round reliable deliveries and a consistently good product. The company has even developed a stock monitoring system that alerts clients when it is time to reorder.

Ultralam®

This passion and commitment to the milk industry also ensures that quality and attention to detail are never compromised. Ultrapak has also been instrumental in the growth of many small independent dairies into large and sophisticated milk packaging businesses. The production of dependable, cost-efficient sachet packaging has made it possible for small African producers to access the milk market successfully.

Exports

The Ultralam® Brand continues to surge into new markets. Export opportunities with sub-Saharan Africa abound and the product is proving popular within the South African Development Community (Sadec) region. Ultrapak is ready to extend capacity further north through investment and anticipates that additional wealth creation would occur on a local scale. Along with Ultralam® goes the infrastructure that has proved to be so successful in South Africa.





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Merial plays a major role in Kenyan and Ugandan dairying

Merial is one of the main animal health companies operating in Kenya and Uganda. We provide various veterinary products that include Ivomec, Trodax, Samorin, Trypadim and Novidium.



In areas where tsetse fly is endemic, it would be impossible to keep dairy animals without Samorin and Trypadim in the costal areas and the lake basin. Indeed, the success of the dairy industry in Kenya and Uganda has been attributed largely to the availability of the trypanocides and good acaricides.

Merial is busy introducing quality acaricides in the East African region. This will compliment our other animal health products in promoting the region's dairy industry. One satisfied dairy farmer is Hussein Dairies in Mombasa. The farmer confirms that without Merial's trypanocides, they would have gone out of business long ago.

He keeps Friesian animals in a very heavily tsetse-infested area, but has managed to keep a herd of over 200 milking cows! Other notable success stories in endemic areas include ADC Galana, Vipingo Daries and Mike Fowler's farm. These farms are wonderful examples of what farmers can achieve in partnership with reputable animal health companies such as Merial.

There are about three million dairy animals in Kenya. The industry is divided into three distinct systems:

Commercial large-scale farming

There are about 800 000 heads in this sector. However, this accounts for 40% of the total milk produced. Most farms have their own processing plants and have customised milk products. The farms are well-managed and use modern farm management systems that include proper veterinary services.

Range dairy farming

There are about one million animals in this sector and they are dual cross-breeds (Friesian/Boran, Friesian/Saiwal) and the farms are used mostly to provide heifers for export to the neighbouring countries. The excess milk is sold to the co-op creamery.

Zero grazing

This sector is dominated by small-scale farmers who keep between 1-2 animals in small enclosures and feed the stover from other farming activities on land that is between 0,5 and one acre. This sector accounts for more than 40% of the milk delivered to the creamery.

A Change of Tune?

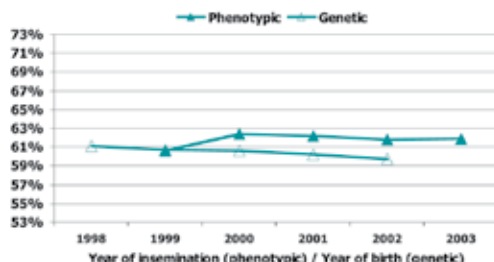
Twenty years ago, most geneticists would have said that fertility has too low heritability to be worth selecting for. However, they have changed their tune. Cow fertility is a trait with a large economic value. We now have better data and better genetic evaluation methods, and we know that in such conditions, we can improve the trait.

Cow fertility has a major economic impact on farm profitability. Many producers today are concerned that it is getting more difficult to get cows in calf, and are sometimes quick to blame genetics. In reality, 96% of the factors that affect conception rate have to do with management and environment. Also, there are big differences between herds due to nutrition and heat detection methods. Of the 4% of differences that are due to genetics, about 3% correspond to the fertility of the cow and about 1% to the fertility of the semen used on that cow. The fertility of a bull's semen has little to do with daughter fertility, based on current scientific evidence. It is influenced by the health of the bull when the semen was collected, the conditions of the collection and the care with which the inseminations are made as well as genetic factors. In this article, I will focus on the biggest genetic factor: the fertility of the cow.

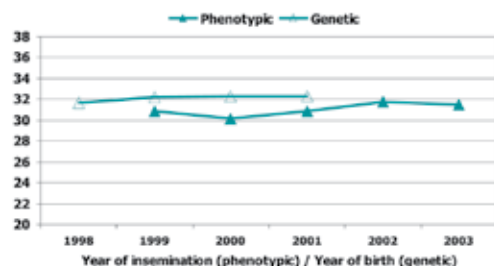
Are declines in cow fertility reported by breeders across the world due to genetics or other factors? Given the strong selection for production traits that has occurred over the last few decades, and the fact that most scientific reports show a negative genetic correlation between production and fertility, one might expect some genetic decline in fertility. Another genetic cause of a reduction in fertility could be increased inbreeding due to the widespread use of a limited number of popular sires. However, there is no way to separate what is genetic and non-genetic until fertility data is available and can be analyzed. Fortunately, in Canada, a comprehensive system for the collection of breeding records from A.I. units was developed in the late 1990's. Along with DHI records, this provided the data necessary to answer the above question and compute genetic evaluations for cow fertility, starting in 2005.

Figures 1 and 2 show trends for 56-day non-return rate (NRR) and interval from first service to conception for Holstein cows, as calculated by Canadian Dairy Network (CDN). Genetic trends for NRR are slightly downwards from 1998 to 2003. However, the decline is small, about 1% over

the 4-year period. Phenotypic trends for NRR went up slightly from 1998 to 2000, but are flat afterwards. For interval from first service to conception, genetic trends have increased from 17 days to 17.5 days, while phenotypic trends have remained flat. Therefore, one can observe a small but negative genetic change in female fertility during the period analyzed. The change is much less than the drastic decrease that some have claimed.



▲ Figure 1: Non-Return Rate For First Lactation Holsteins



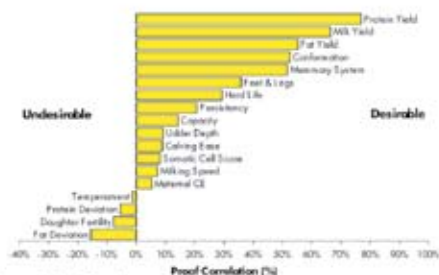
▲ Figure 2: Trend for First Service to Conception in Holstein Cows

However, it is possible that a slow but continuous decline in fertility has also taken place before 1998, as a result of selection for production. Such a decline should be addressed, if at all possible.

Does this mean one should stop selecting for production?

From an economic standpoint, the answer to this question is clearly no. The value of increases in production per cow exceeds any concurrent losses in fertility, because these losses are small by comparison. It therefore makes sense to keep production as a key component of selection indices.

The good news, however, is that the negative association between production and fertility is not all that strong. Therefore, provided we have tools to select for fertility, it is possible to increase production while maintaining or increasing cow fertility. This is why genetic evaluations for cow fertility are so valuable. Figure 3 shows bull proof correlations between the lifetime production index (LPI) and various traits before 2005. At that time, the LPI had no fertility component. Selection for the LPI improved many traits, but had a negative effect on daughter fertility, since the correlation between LPI and daughter fertility was about -10%. Figure 4 shows the same relationships for the LPI introduced in February 2006.



▲ Figure 3: Proof Correlations Before 2005



▲ Figure 4: Proof Correlations in February 2006

This new LPI has a weight of 5% for the daughter fertility index (DFI). As a result, selecting for the new LPI will actually improve daughter fertility. This demonstrates quite effectively the power of selection indices, and how a relatively small weight for a trait (5% in this case) is sufficient to reverse a negative trend. You might also notice that the new LPI improves fat and protein percentages, because it now incorporates relatively small weights for these two traits. If one wished to make larger improvements in fertility, one could increase its weight from 5% to 10%, for example, without compromising very much

the progress accomplished in other traits.

In fact, given that indirect herd life is now partly based on daughter fertility, the real weight of cow fertility in the latest LPI is closer to 7% than 5%. Provided producers and A.I. centers use the LPI as a guide for their selection, the small downward trend in fertility observed in the Holstein breed can be reversed.

How should new daughter fertility evaluations be used in practice? Cow evaluations have a low accuracy, given the low heritability of the trait (3-4%). For this reason, CDN does not make them available. Selection then has to be based primarily on bull proofs for daughter fertility. Producers should breed cows that are less fertile, or come from less fertile families, to bulls with a higher proof for DFI. This is particularly true if these cows are from sires with a low proof for DFI.

At Semex, bulls with low daughter fertility proofs are used much less as sires of sons than they would have been otherwise. In addition, sire analysts will protect a sire with a lower proof for fertility by mating him to bull dams from high DFI sires. One limitation of daughter fertility proofs is that first-crop bulls tend to have a lower accuracy, therefore their DFI proofs can vary more over time. However, provided the approach described above is used in a systematic way, it will work on average and will slowly increase fertility in the overall cow population.

What is next? The DFI is not the end of the story when it comes to selection for cow fertility. The University of Guelph has recently completed an analysis of 16 traits related to or having an effect on fertility for both heifers and cows. This promising work will be applied to Canadian genetic evaluations over the next one to two years. Considering all these traits jointly will increase the accuracy of genetic evaluations for fertility and provide information on new traits, such as stillbirth.

Conclusion We now have good tools to address the genetic side of cow fertility, thanks to the willingness of Canadian producers to accurately record breeding data, and to the development of advanced evaluation methods for these traits. Because of its low heritability, it is best to select for cow fertility by including it in a selection index. Progress will be slow but steady if it is used systematically. Keep in mind, however, that proper nutrition, heat detection and care at the time of insemination have 24 times more of an impact on conception rates than selection for daughter or male fertility. Therefore, always give these management factors the highest priority.

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Our milk a blessing to Africa

by Reg Weiss

Amate Gaitu! ("Our Milk") is the name of the Ugandan co-operative group with probably the longest and grandest vision statement in Africa, Michael Baingana, co-ordinator of the co-operative, told the South African Society for Dairy Technologists (SASDT) symposium at Gordon's Bay in South Africa. The successful symposium was held on 25 and 26 April. His visit to the symposium was sponsored by Semex South Africa.

A strong supporter of Nepad, his co-operative is to arrange for its members to visit and gain experience on some of the better developed farms and production installations in South Africa, Kenya and elsewhere.

South Africa, he said, is a potential blessing to the rest of Africa, because it can serve as the main source of expertise, technology, input and investment so sorely needed to unlock Africa's untapped potential. The co-operative, he said, looks forward to collaboration with South African farmers in servicing the new Common Market for Eastern and Southern Africa (Comesa).

He believes this market will be demanding



Derick Burger, commercial manager of Semex, South Africa, Michael Baingana of Amate Gaitu Co-op, Uganda, and Colette Meyers, business manager of Semex. Semex sponsored the visit of delegates from Uganda and Kenya to the SASDT symposium

some 36 billion litres of dairy products within 15 years. Translated into figures this could mean half a million jobs on some 10 000 dairy farms, supply chains, processing and distribution. Apart from providing quality nutrition and health to millions more in Africa, it would contribute some US\$5 billion to Uganda's GDP and much more indirectly to ancillary industries. **DMA**

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