

# **Cow Comfort and the Effects on Productivity and Profitability**

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The dairy cow's environment has a profound affect on her productivity and health, which inevitably affects profitability. An underlying culprit affecting productivity and profitability may be cow comfort. Stall design and surfaces are the number one factor that influences cow comfort. However, air quality and ventilation are also important. Good lighting has also shown to have impact on productivity. With all these variables affecting production, dairy producers and agriservice professionals should review the facilities to learn if any opportunities exist. Many existing facilities can be improved with minimal expense. A facility that is cost effective in design and that provides maximal comfort to reduce stress and incidence of injury may play an important role to in increasing productivity.

## **Why emphasis on cow comfort?**

The objective of the resting area is to encourage cows to lie down as much as possible. Research by Metcalf and Rulquin point to the increased blood flow across the mammary gland when dairy cows lie down compared to when standing. The increased blood flow (reported at 25% greater than when standing) results in increased nutritional efficiency and milk production. It's this point that most directly relates cow comfort to productivity. Cows are designed to eat, lie down, eat, lie down, over and over again. If, cows stand simply because it hurts when they lie down, or it is physically difficult to lie down, the pattern will be broken and she will not consume those last mouthfuls of dry matter that translate into additional milk production. In the many past nutrition seminars, emphasis has been placed on dry matter intake and how every pound of dry matter can yield two to 3 pounds of milk production. If a cow limits her dry matter intake because of uncomfortable stalls, poor ventilation, or result of injuries, the following consequences may occur:

- Excessive body condition loss will occur postpartum, particularly in first calf heifers.
- Excessive weight loss will lead to clinical and subclinical ketosis, other metabolic disorders, reduced reproductive efficiency, and reduced milk production.
- Excessive grain feeding, poorly balanced rations can cause laminitis in cows, or it can be induced if cows are standing for excessive periods of time on concrete surfaces.
- Herds where cows are under long term stress will likely have a higher cow turnover.

These problems are very costly and are frequently blamed on the feeding program. Yet in reality they can be due to cows standing for too many hours of the day or other factors contributing to poor cow comfort in the dairy.

### **Approaches to Evaluating Cow Comfort**

To really evaluate whether cows are comfortable or not, perform the following observations. Go out to the barn during a period when the cows are relatively undisturbed. See what the cows are telling you. Count the cows lying down and the cows eating. Compare that to the number of cows on pasture that would be standing for no reason. Very few physically sound cows stand on pasture for no reason, other than grazing. Would you feel comfortable taking a nap in some tie stall or freestalls. If, after counting the cows, you feel that there is a problem with cow comfort, the next step is to decide the cause of the problem.

Cows must make several decisions before lying down, the decisions that we speculate the cows must make will give us an opportunity to evaluate where potential problems arise. Is it easy for the cow to step up into stall? In free-stalls, an 8-inch curb is probably ideal. However, cows have been observed to step up 14 inches to enter comfortable freestalls. Take the time to observe several cows in the process of lying down. Do they bang into anything? Are they hesitant or confident? Are any physical injuries occurring as they lie down? Stand in a typical free stall or tie stall and drop to your knees. Is it a painful experience? Now watch cows in the process of standing. Do they do it with ease? Is there adequate lunge space? Do they bang into anything? Take a good look at the physical condition of the cows. If the cows have swollen knees, or swollen or abraded hocks then you have a stall problem. What about the rump and hooks area? Are there abscesses, or bumps and bruises? Upon completion of these simple observations one should have an idea whether or not the free-stalls or tie stalls require modification.

### **Cow Comfort and Footing**

Skid-resistant walking surfaces reduce injuries, and enhance estrus detection (1). Grooved floors are superior to smooth surfaces. It has been found that hexagonal pattern of grooves improve skid resistance over a parallel pattern of grooves but make impact cleaning, especially in flush-system facilities. Cows have been reported to walk from 500 to 7,500 feet per day in confined housing, thus they are at a great risk of injury from smooth floors.

The manure removal and collection system is related to cow comfort in that frequent removal results in better floor condition. Alleyways can provide good floor conditions for the cows. Infrequent floor cleaning leads to wet surfaces which in turn cause hooves to become softer and

more foot related problems to develop. Also, wet concrete can be very abrasive to the hoof. Poor floor design results in animals being reluctant to walk from their resting area to the feed bunk. Overcrowding or high density slippery flooring will discourage animal movement, especially by cows that are low in the social order dominance. Animals must not be forced to compete for restricted amounts of feed or limited bunk space.

## **Ventilation**

A well-ventilated dairy facility is important for both the dairy cow and the worker as well as maintaining the integrity of the structure itself. A proper ventilation system must be designed to avoid high humidity and drafts during the winter, and high temperatures and stagnant air during the summer. A well-designed ventilation system should maintain an acceptable air quality in terms of respirable dust, ammonia, manure gases, and disease organisms throughout the facility. High levels of respirable contaminants can lead to respiratory problems in cattle and workers alike.

Producers should be encouraged to buy complete ventilation systems rather than buying components and trying to design systems on their own. Technology should be adopted that has been proven to work in our climate. Barns that are designed well for ventilation, facility, and floor functionality are a pleasure to work in. A dreary, drafty, and smelly (high ammonia, relative humidity, and temperature combination) barn is only entered when deemed necessary. This is reflected in poor management and animal performance.

When evaluating ventilation systems, consider noting the following observations:

- Ammonia build-up, eye irritation, smell retained on clothing after leaving facility.
- Excess humidity, condensation, slippery floors.
- Animals coughing, respiratory disorders.
- Adequate inlets, clogged inlets inadequate ridge opening, not properly using curtains.
- Dirty fans, improperly functioning fans.
- Accumulation of dust and cob-webs.

## **Lighting**

Although not directly related to cow comfort, lighting requirements must not be overlooked. Suggested lighting intensity for housing is 10 to 30 foot candles. Supplementing cows with 16 to 18 hours of daily lighting increases milk yield five to 16%, may slightly decrease milk fat percentage, increase feed intake, induces the loss of long winter hair coat, and does not appear to affect reproduction. The key to achieving a milk production response is to provide consistent light (16-18 hours) and dark ( 8-6 hours) cycle and minimal light intensity of 10 to 30 foot candles. Cost benefit analyses show that installation of a complete lighting system will pay for itself in about two fall/winter seasons.

## **Summary**

Addressing issues concerning cow comfort may be a component of the "missing links analysis" conducted as it relates to maximizing herd performance. Reduced cow comfort may result from poor stall design resulting in lower stall usage, inability to get proper resting need for rumination, or increased incidences of injuries. Cow comfort and ventilation problems exist in many barns which lead to reduced efficiency, increased costs, and problems with cow health. Dairy cow housing design must allow for cow comfort. A well-designed barn that is spacious, well lit, enjoys good air quality, and has well designed resting areas is conducive to a stress-free environment where dairy cows can do well. It also provides a good working environment for farm employees.

Attention to detail is one of the keys to success in dairying. Accomplishing this goal in a pleasant working environment is far easier than an environment that is stressful to animals as well as barn workers. It should be added that many of these areas can be improved with small investment.