



# Cattle Producer's Handbook

Animal Health Section

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## Identifying and Minimizing Stress in Cow-Calf Operations

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What is stress? Stress is an easily understood concept, but difficult to define in scientific terms. One definition of stress is the sum of adverse effects in the environment and/or management system that force a change in the normal balance of the body's biological systems. If the animal's compensating changes to stress are inadequate or inappropriate, disease and possibly death may occur.

Animals respond to stress by several interacting mechanisms that may affect their behavior, physiology, biochemistry, and immunity. Although pain and stress are commonly linked, their responses are somewhat different. Pain is initiated by stimuli transmitting information to the central nervous system via receptors located in the skin, muscles, viscera, or joints. The body then responds by changes similar to those exhibited during stressful situations. However, pain symptoms are often more acute and have a sudden onset. Identifying and minimizing stressful situations enhances well-being, growth, and reproductive efficiency of the animal as well as economic benefits for the producer and consumer.

### Common Types of Stressors

A satisfactory environment for beef cattle provides for thermal comfort, physical comfort, behavioral needs, and minimal disease or adequate health. Each of these four areas is a potential source of stress.

### Thermal Comfort

Cold or heat stress can affect young or sick animals much more severely than mature, healthy cattle. The optimal thermal (temperature) range for calves is 50° to 85°F, while 30° to 60°F is optimal for mature cows. These temperature ranges promote maximum performance with the least amount of stress for the animal. In these ranges, cattle can maintain body temperature by constriction or dilation of the blood vessels, modification of postures and behavior, or changes in hair elevation.

As air temperature falls below the lower critical temperature (50° and 30°F for calves and cows, respectively), food energy is diverted from production or growth to produce additional body heat and maintain body temperature. This ultimately leads to a reduced feed efficiency. Cold stress also decreases the rate of absorption of colostrum in newborn calves and may depress their immune system.

The upper critical temperature, approximately 85°F for calves and 60°F for cows, is reached when the animal cannot dissipate enough metabolic heat to the environment to maintain body temperature.

Food intake is reduced, thereby lowering heat production generated by digestion and absorption of nutrients. This decreases the growth rate in cattle. Excessively high temperatures may cause panting that can compromise tissues of the upper respiratory system