

How Feeding-Site Mud and Temperature Affect Animal Performance

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The use of temporary feeding sites during winter and early spring to supply feed and/or water to livestock is a common livestock management practice. When selecting a location, producers should be aware of how these sites affect environmental and animal performance. Animal growth performance can be greatly affected by improper site selection and management. This publication highlights issues producers should evaluate when selecting a winter feeding site and describes how these factors affect animal performance.

Effects of Mud on Animal Performance

Winter feeding sites can become muddy quickly when animals are active after moisture falls. Research is clear on the negative effect of muddy conditions on animal performance.

- Bond et al. (1970) reported that mud reduced daily gains of animals by 25 to 37 percent and increased the amount of feed required per pound of gain by 20 to 33 percent.
- The National Research Council (1981) reports that small amounts of mud (4 to 8 inches deep) can reduce feed intake of animals by 5 to 15 percent, while larger amounts of mud (12 to 24 inches deep) can decrease feed intake by up to 15 to 30 percent.
- The University of Nebraska has estimated the effect of mud on animal

performance based on temperature conditions in the range of 21 to 39°F. (Table 1)

- Smith (1971) also reported that animals in areas of muddy conditions have an increased need for energy to maintain their maintenance requirement. (Table 2)

Effects of Climate on Animal Performance

The relationship between animals and their thermal environments can be described by determining the thermoneutral zone. This is the range in effective ambient temperature where rate and efficiency of performance in animals is maximized. For healthy cattle, this is approximately 23 to 77°F (Hahn, 1999). When the temperature falls below an animal's lower critical temperature or rises above the upper critical temperature, the animal must use

Table 1. Risk potential caused by mud, 21 to 39° F ^a

Mud Depth	Potential Loss of Gain
No mud	0%
Dewclaw deep	7%
Shin deep	14%
Below hock	21%
Hock deep	28%
Belly deep	35%

^aBeef Feeder, University of Nebraska, August 1991.

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more energy to keep warm or cool. Also, as temperatures rise above or fall below the thermoneutral zone, animal bunching may occur, which can reduce or eliminate vegetative cover.

A wet hair coat is the most important factor in determining an animal's lower critical temperature. Brownson and Ames (1985) estimate that a steer may experience cold stress at 32°F with a dry winter coat, but this may change to 60°F if the animal's coat is wet. (Table 3)

Weather Protection

Climatic variation is a large component in determining the comfort level of cattle. A seven-year study by Hoffman and Self (1970) reported that cattle given access to shelter during winter months had the following benefits:

- Increased gain by 15 percent.
- Improved feed efficiency by 11 percent.

Summary

Livestock producers should make management decisions to minimize animal exposure to mud and provide protection from adverse weather conditions to maximize animal performance.

Table 2. Estimated effect of mud on net energy needed for maintenance requirements^a

Lot condition	Multiplier for NEm ^b
Outside lot with frequent deep mud	1.30
Outside lot, well mounded, bedded during adverse (chill stress) weather	1.10
No mud, shade, good ventilation, no chill stress	1.00

^aSmith, 1971.

^bNet Energy for Maintenance.

Table 3. Estimated lower critical temperatures for cattle with varying hair coats^a

Hair Coat	Feed Level	Lower Critical Temperature (°F)
Summer coat or wet	Maintenance	60
Fall coat	Maintenance	45
Winter coat	Maintenance	32
Heavy winter coat	Maintenance	19

^aBrownson and Ames, 1985.

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