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Understanding and Managing Shrink

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Cattle are typically marketed and transported several times in their lifetimes. Marketing and transportation can be the most fatiguing event in a feeder calf's life. Each move not only stresses calves and increases the risk of bovine respiratory disease and associated morbidity, but also results in weight loss that must be regained after arrival. In addition, shipping of cattle typically involves feed and water deprivation that contributes to weight loss. Liveweight loss in cattle that results from feed and water deprivation and transportation is commonly referred to as shrink. Shrink can also refer to a loss of weight in carcasses or retail cuts. Reduced liveweight and carcass yield are not the only results of transport and handling stress. These stressors can negatively impact meat quality as well.

Factors Affecting Shrink

Several factors impact shrink including transit time, transit distance, environmental conditions (weather and transit conditions), cattle handling methods, and cattle management including nutrition. Research indicates that the combined effects of shipping and handling result in greater weight loss than holding cattle off of feed and water alone. Transit shrink in beef steers has been demonstrated to represent as much as 68% of the shrink from the combination of both fasting and transport. Weight loss varies depending on the circumstances, but a good rule of thumb estimate is that about 0.75% of cattle body weight will be lost per day with feed and water deprivation, and the weight loss will not necessarily be the same amount each day. When feed and water are unavailable, study results indicate that cattle shrink about 1% per hour for the first three to four hours and then roughly 0.25% per hour for the next eight to ten hours. This weight loss can increase several-fold when transport stress is added.

A Florida study reported that newly weaned beef calves that were transported three hours lost 5.3% of their body weight after transport and averaged a body weight loss of 3.4% after one week, while similar newly weaned calves that were not transported increased their body weight by 0.7% over the same seven-day period. In a second trial, however, the transported calves regained lost body weight faster than non-transported calves over a 2-week period. Other research from Texas and Oklahoma indicates that transportation shrink varies more from year to year than from preweaning management, suggesting that climatic conditions may be a major factor affecting body weight losses of transported beef calves. Another study found that steers transported five hours lost 4.6% of their body weight, steers transported ten hours lost 6.5% of their body weight, and steers transported fifteen hours lost 7.0% of their body weight illustrating that increased transit time tends to increase shrink. In this trial, recovery to pre-transit weights took five days. This is normally the minimum recovery time. Recovery can take up to 30 days in more severe situations. It is generally accepted that increasing transit

time exacerbates feed and water deprivation and leads to dehydration. Emphasizing low stress cattle handling and shipping in minimum time can benefit both buyer and seller by reducing cattle shrink, stress, morbidity, and cost to regain lost weight.

The amount of fill can affect the degree of shrink. Lush grass, silage, and haylage diets usually produce more gut fill than hay or high-concentrate diets. Cattle shipped directly off of milk and grass may undergo a greater percentage shrink than cattle off of a preconditioning or hay and grain diet. In addition, calves shipped directly off of their dams must deal with weaning stress and possible unfamiliarity with feed bunks and water troughs. Many producers attribute shrink to loss of gut fill alone. Much of this weight loss is gut fill, feces, and urine that can be easily replaced. However, some of this weight loss is actual loss of body tissue. Research out of Oklahoma showed that fecal losses accounted for 65% of total body weight lost, and urinary excretions accounted for 38% of the weight lost. This leaves 7% weight loss from another source, likely body tissues (carcass components). Tissue loss takes longer to regain than weight loss from urine and feces. Since muscle contains more water than fat, higher levels of shrink are typically encountered in cattle with higher lean to fat ratios. Therefore, cattle frame size, age, sex, and body condition can impact degree of shrink.

Management strategies that have been researched in an attempt to deal with transport stress and reduce shrink have included preconditioning programs, rest periods during and after transit, potassium supplementation, and use of electrolyte solutions. Research shows that transported or feed and water deprived cattle are challenged with a mild metabolic acidosis which may be the result of body water loss. There is evidence that either electrolyte solutions or water can help alleviate this dehydration and some stress in transported cattle. Any added stress such as overloading the truck, unfamiliarity with confinement, or extreme temperature and moisture conditions can increase shrink. Cattle with temperament problems may be subject to higher levels of shrink as well. There is new evidence from Florida and North Carolina that early-weaned calves maintained onsite before shipping might be more tolerant of the stressors associated with transportation and feedlot entry. Although this research revealed no difference in shrink, there was a notable difference in recovery of lost weight, with early-weaned and preconditioned calves having an advantage over traditionally weaned calves.

Economic Impacts of Shrink

Weight is an important factor in determining calf value. In order to determine fair market prices, buyers and sellers must account for shrink appropriately. Cattle buyers need to have a good handle on the costs involved in cattle regaining lost weight. Shrink in feeder calves commonly falls within 2% to 8% of liveweight. Pen averages for shrink in the Mississippi Farm to Feedlot Project for cattle shipped from Mississippi to Kansas ranged from 5.59% to 7.02% in 2004 – 2005 and 5.98% to 8.71% in 2003 – 2004. A Texas study of 117 calves transported 500 miles reported an average transit shrink of 5%, but the range was from 1.5% to nearly 8%. It revealed that weanling calves of similar genetics could vary greatly in transit shrink percentages. These calves were managed differently preweaning, and this affected pretransit weight. The lighter calves experienced less percentage shrink than the larger calves. Slaughter steer shrink is

another important shrink often ranging from 2% to 6% that influences dressing percentage (the ratio of hot carcass weight to liveweight).

There can be uncertainty in cattle weights, and this adds to the challenge of determining a fair market price based on weight. Weights are typically measured at a point in time. What happens to those weights before or after those moments where weights are recorded can vary. For instance, shrink differences can be expected if calves are tanked up on water or feed versus being held off of water and feed, and buyers may recognize “overfilled” cattle. Differences in water intake can be expected with different environmental conditions as well. Pencil shrink is an estimated shrink used in many marketing transactions and is a deduction from an animal’s weight to account primarily for fill. It is frequently expressed as a percentage of live weight, e.g., 3% for off-pasture weights and 4% for fed cattle weights. The degree to which the estimated shrink is accurate determines the fairness of the price. An example of factoring shrink into calf price is as follows:

When buying cattle, it is useful to calculate a price that compensates for shrink. Suppose that 600 lb. calves sold for $1.05 per lb. Then the total value would be $630 per head. If the shrink was 4% (24 lbs. in this case), then the delivered weight would be 576 lbs. per head. The value of the weight delivered would be $630 / 576 lbs. = $1.09 per lb.

When selling cattle, calculate a net price after shrink allowance. If a 4% pencil shrink was imposed on this transaction, then the total amount received per head would be 576 lbs. (delivered weight after shrink applied) x $1.05 per lb. = $604.80 per head. Another way to calculate the total amount received per head is to decrease the price per lb. by 4% and use the initial unshrunk weight: $1.05 per lb. x .96 (to account for 4% shrink) = $1.008 per lb., $1.008 per lb. x 600 lbs. per head = $604.80 per head.

Shrink is an inevitable yet manageable part of transporting cattle. Improvements in calf preconditioning programs, pretransit cattle management, cattle handling, shipping conditions, and management after arrival can be advantageous to both cattle buyers and sellers. Understanding the factors affecting shrink can help producers and their customers to make more informed cattle marketing and purchasing decisions that more accurately and fairly account for shrink. The degree of actual shrink, how shrink is estimated and accounted for in marketing transactions, and how shrink impacts subsequent cattle performance and production costs ultimately influences net returns. For more information on cattle shrink or related topics, contact your local county Extension office.