

# Hail Bruising of Fed Cattle

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## Abstract

On May 25, 1999, a storm producing hail approximately  $1\frac{3}{4}$  to  $3\frac{3}{4}$  inches in diameter crossed over a feed yard. On four occasions following the storm, 409 carcasses from six pens were observed at an abattoir. On day 1, 29 carcasses were examined at the abattoir and in the grading cooler. On days 10, 15, and 49, additional cattle ( $n = 117, 173, \text{ and } 90$ , respectively) were examined at the abattoir only. On day 16 following the first storm, a second storm, producing approximately  $1\frac{3}{4}$ -inch-diameter hail, crossed over the feed yard. Bruises were classified into three size categories, into short- and long-duration categories, and location was recorded. One hundred, 85, 54, and 44% of the carcasses exhibited bruises on days 1, 10, 15, and 49, respectively. On days 1, 10, 15, and 49, 100, 98, 65, and 27% of bruises were classified as short-duration. Multiple bruises were observed on 100, 75, 42, and 16% of carcasses on days 1, 10, 15, and 49, respectively. Storms producing hail approximately  $3\frac{3}{4}$  inches in diameter have the potential to cause extensive bruising in cattle in open feed yards. Cattle sold within 15 days of such storms may experience significant hail-associated carcass trim loss, but by day 49 bruising appears to return to baseline levels.

## Introduction

Cattle carcass bruising costs the U.S. cattle industry \$114.8 million each year.<sup>5</sup> There are many causes of bruises in cattle. In an effort to control losses due to bruising, research has been conducted on several of these causes, including transportation,<sup>2</sup> handling equipment design,<sup>4</sup> and the horn-induced trauma.<sup>3</sup> Hailstorms represent another potential cause of bruises.

Over three hundred severe thunderstorm warnings are issued in the Texas Panhandle each year. These

storms produce damaging winds, torrential rain, and hail. This report describes carcass bruising, over time, following a hailstorm. To our knowledge, this is the first report describing carcass bruising at time intervals following a hailstorm.

## Materials and Methods

On May 25, 1999, a storm producing hail approximately  $1\frac{3}{4}$  to  $3\frac{3}{4}$  inches in diameter crossed over a feed yard. On four occasions following the storm, 409 carcasses from six pens were observed at an abattoir. This was a non-random, convenience sample. On day 1, 29 carcasses were examined at the abattoir and in the grading cooler. On days 10, 15, and 49, additional cattle ( $n = 117, 173, \text{ and } 90$ , respectively) were examined at the abattoir only. On day 16 following the first storm, a second storm, producing approximately  $1\frac{3}{4}$ -inch-diameter hail, crossed over the feed yard. All carcasses observed in the study were at the feed yard during the initial hailstorm. All carcasses observed on day 49 were at the feed yard during both hailstorms.

Bruises were placed into three categories based on size; category 1, 2, or 3, correspond to bruise diameters of less than 5, 5 to 11, or greater than 12 inches. Bruises were classified into short- and long-duration categories based on the appearance of hemorrhage. Short-duration bruises were dark red in color with a bloody appearance and hemorrhage was more superficial. Long-duration bruises had a light purple color, with a more coagulated appearance, and the hemorrhage appeared to be less superficial. Bruise location was recorded as rump, tail head, hip, loin, rib, and shoulder. The trim loss due to bruising was estimated based on visual inspection of each carcass. One individual classified bruises on day 1, and another individual classified bruises on all other dates.

Changes in proportion of carcasses in a given category from one observation day to the next were assessed using a two-tailed Fisher's exact test.<sup>1</sup> Probabilities <0.05 were considered significant.

## Results

Percentages of carcasses showing various bruise scores, bruise duration, and multiple bruises, along with estimated carcass trim due to bruising and the associated monetary loss, are shown in Table 1.

## Discussion

All cattle shipped the day after the storm showed extensive bruise damage in all six wholesale regions of the carcass. Bruises present on the carcasses ranged from one inch in diameter to multiple confluent bruises covering the entire dorsum of the carcass. The bruise damage required extensive trimming, with estimated trim loss ranging from 25 to 100 lb.

Data from cattle shipped 10 days after the storm indicated some resolution of bruises. There was significant reduction in percentage of cattle displaying bruises and in percentage of cattle displaying multiple bruises. Resolution continued and all bruise parameters assessed on day 15 were significantly lower than day 10.

Forty-nine days after the initial hailstorm, cattle showed numeric reduction in all bruising parameters compared to the day 15 observations. However, only

the change in percentage of carcasses with short-duration bruises was statistically significant.

On day 16 cattle were exposed to another hailstorm. While the second storm produced smaller hail than the first storm, the second storm had the potential to induce new bruises. This confounded the day 49 results, since 49 days had elapsed since the first hailstorm and 33 days had elapsed since the second hailstorm. However, the 49-day observations are at, or near baseline bruising rates reported for U.S. feedlot cattle<sup>5</sup> and since we were unable to differentiate hail-induced bruises from baseline bruises, we concluded that resolution of hail-induced bruises, originating from both storms, was complete. The baseline bruising rates reported for U.S. feedlot cattle<sup>5</sup> do not include any indication of time since bruising, so we were not able to compare our duration data to previous reports. Despite the non-random nature of the sample, based on the widespread damage across the feed yard and the surrounding community, we have no reason to believe that one pen was more severely affected than another, however, we cannot rule this out as a possible contributor to differences between pens.

Table 1 also presents an estimate of the economic impact of hail damage on carcass value. These are based on estimates of actual carcass trim observed in the grading cooler on day 1, and estimates of potential carcass trim based on abattoir observations for the other days. As such, these estimates are less accurate than measuring the actual weight of trim from each carcass, but

**Table 1.** Percentages of carcasses displaying bruises, short-duration bruises, bruise score, and multiple bruises, along with estimated carcass trim due to bruising and the associated monetary loss in cattle 1, 10, 15, and 49 days after a hail storm.

	Day 1	Day 10	Day 15	Day 49
N	29	117	173	90
Bruised carcasses (%)‡	100	85*	54*	44
Carcasses displaying short-duration bruises (%)‡	100	98	65*	27*
Carcasses displaying multiple bruises (%)‡	100	75*	42*	15*
n	**	112	105	46
Bruise score 1 (% of all bruises)	**	85	87	35
Bruise score 2 (% of all bruises)	**	13	13	10
Bruise score 3 (% of all bruises)	**	2	5	1
Estimated average bruise trim (lb)	50	25	10	2
Estimated monetary loss (\$US)†	\$55.21	\$27.60	\$11.40	\$2.21

‡ Percentages are figured of total number of head.

\*Fisher's exact test indicated proportions differ from previous observation ( $P < 0.05$ ).

†Based on USDA Market News reported value of \$110.41 per carcass hundredweight.

\*\*Due to the extensive amount of damage, bruise scores were not assigned to day 1 observations.

they do provide a starting point from which producers and their consultants can make informed marketing decisions. The economic impact on cattle producers of hail-induced bruising will be affected by terms of sale (live versus carcass), as well as carcass value compared to daily feedlot costs.

### Conclusions

Storms producing approximately 3<sup>3</sup>/<sub>4</sub> inch-diameter or greater hail have potential to cause severe bruising in cattle in open feed yards. Cattle sold within 15 days of such storms may experience significant hail-associated carcass trim loss, but by day 49 bruising appears to have returned to baseline levels.

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### References

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## Abstracts

### Clinical, haematological and biochemical findings in milk-fed calves with chronic indigestion

H. Stocker, H. Lutz, P. Rüsche

*Veterinary Record* (1999) 145, 307-311

The principal clinical signs in 59 milk-fed calves with chronic indigestion were general malaise and depression, poor appetite, poor body condition, dehydration, a dull and scaly hair coat, alopecia and clay-like faeces. All the calves had metabolic acidosis, which was associated with an inability to stand up in more than

half of them. There were significant differences in the severity of acidosis between the calves that could stand and those that could not. Other signs in some of the calves were dehydration, leucocytosis, and increased activities of liver enzymes.

### Nematode control practices and anthelmintic resistance in dairy calves in the south west of England

K. Stafford, G.C. Coles

*Veterinary Record* (1999) 144, 659-661

A postal survey of worming practices on West Country dairy farms was undertaken and farmers were requested to send faecal samples for nematode egg counts. The majority of the farmers who responded had a nematode control policy which was based on a mixture of anthelmintics and pasture rotation. Sixty-five percent turned out calves on to the same paddock each year and 57 percent treated their stock with anthelmintics during the second year. Ninety farms submitted samples for analysis but only 16 samples contained sufficient eggs to justify repeat egg counts and only eight of these produced enough eggs for in vitro tests. The small number of positive samples, even into the latter part of the

year suggests a heavy use of anthelmintics with relatively clean pasture. One Somerset farm had larvae which developed in high concentrations of ivermectin, and eggs were still being passed after two treatments with ivermectin at the manufacturer's recommended dose seven days apart. Of 100 male nematodes isolated from two of the calves, 88 were *Cooperia* species and 12 were *Nematodirus* species. A controlled trial with this isolate in eight Friesian male calves showed a 44 percent reduction in egg counts at day 7 but no significant reduction in worm burden postmortem. This is the first reported case of ivermectin-resistant *Cooperia* species in cattle in the United Kingdom.