



Snort If You're Tough

Ill-tempered cattle can knock down beef quality.

BY LINDA SLEICHTER

Some cattle are harder to handle than others. They don't like chutes, and they are more jumpy or tend to run when exposed to a new situation. Often producers just try to deal with these animals, handling them with kid gloves at roundup time but otherwise ignoring their poor dispositions. But, according to recent research, disposition of the cattle may cause more problems than added stress during handling and processing. Excitable, agitated cattle may result in poor-quality meat.

The 1995 National Beef Quality Audit (NBQA) reported that dark-cutting beef (beef that is dark, firm and dry) costs the industry \$6.08/animal harvested

in the United States. Additional loss in consumer dissatisfaction has not been assigned a dollar amount, but it is a major reason for lower demand for beef. By taking steps as an industry to increase meat quality, the beef industry has been improving consumer demand for the product. One step in the process is identifying causes of dark cutters and tough meat, such as excitable cattle.

Cattle that are highly excitable and agitated are more likely to result in tougher meat and borderline dark cutters,



according to research at Colorado State University (CSU). The research scored 1,514 cattle of various breeds based on temperament, with a score of 1 indicating a calm and motionless animal and 5 indicating a rearing or violently struggling animal.

The animals were scored every 60 days at weighing and processing. They were tracked through the slaughterhouse.

Of the animals showing some dark coloring in the meat at slaughter, 30% had an average temperament rating of 5, and 6.7% had a mean temperament rating of 1. The tenderness of

the meat was tested 14 days after slaughter using Warner-Bratzler Shear force (WBS) measurements.

That test, in which higher scores indicate tougher meat, showed a mean WBS of 2.36 for cattle with the calmest temperament score, while the cattle with higher temperament scores averaged a WBS score of 3.14. Furthermore, of the cattle with a WBS score of 3.9 or higher, nearly 30% had a temperament score of 5 and none had a temperament score of 1.

This study clearly identified the connection between the disposition of cattle and the frequency of dark cutters and diminished meat quality.

What's at work

Dark cutters are due largely to preharvest stress.

"Glycogen is a stored form of carbohydrates, and when a large physical demand is put on the animal — such as when it is stressed — the animal will use up the glycogen," says Duane Wulf, assistant professor of meat science at South Dakota State University. "Adrenaline causes the glycogen to be mobilized."

Glycogen is needed to produce lactic acid, which reduces the postmortem pH of muscle. Stress-induced



PHOTOS BY STEVE SUTHER

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depletion of glycogen results in a higher pH in the meat, which makes the muscle dark, dry and firm.

There are a number of reasons dark-cutting meat is discounted, No. 1 being consumer appeal, Wulf says. “It is also more susceptible to microbial growth, has more off-flavors and is tougher than normal meat. It is tougher because the dark-cutting reaction affects protein

degradation, which limits the aging process.”

Even if the reaction to the higher pH is not extreme enough to qualify the carcass as a dark cutter, the higher pH can result in less-tender meat, Wulf explains. “The meat will still be less tender than meat from cattle with calm dispositions.”

Research has found that reducing stress in highly excitable animals will result in higher meat quality and

improved performance. While implementing humane management practices can reduce the stress exerted on these animals, other factors — including weather, the use of growth promotants, genetics, disposition and previous handling experiences of the animals — also can play a part in determining meat quality.

Select for disposition

Temple Grandin, assistant professor of animal science at CSU, and her team have been identifying trends in cattle with poor dispositions. Their research has shown that *Bos indicus* cattle tend to be more excitable than *Bos taurus* cattle.

In addition, cattle with hair-whorls high above the eyes or with no hair-whorl at all tend to be easily agitated and have a stronger startle reaction.

Excessive excitability occurs most often in animals bred for leanness with slender body shapes and fine bones, Grandin says. Cattle bred for large, bulging lean muscles usually have a calmer temperament.

Additional research has been done to rank breeds based on disposition. Data from the Gelbvieh Alliance database found a higher increase of dark

cutters in Limousin and Salers, with Hereford having the lowest incidence. A report from the U.S. Department of Agriculture (USDA) Meat Animal Research Center (MARC) in Clay Center, Neb., found Chianina cattle to have the highest incidence of dark cutters.

“Certain cattle in our yard tend to be more excitable,” says Bill Wohlenhaus, manager of Irsik and Doll Feedyard, a 25,000-head-capacity feedyard near Garden City, Kan. “It depends on genetics and where the cattle come from. No one breed shows more excitability, but individual groups within a breed will be more excitable.”

“While there is variation among breeds, there is also a lot of variation among cattle of one breed,” Grandin says. “An excitable disposition is moderately heritable. Some of the breeds that were having problems with disposition have made it an EPD (expected progeny difference) and have been focusing on improving that trait.”

One way to select for good disposition is to expose the cattle to a new experience and to observe how they react. Rate the

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cattle's excitability on a scale of 1 to 4. When put in the chute, a 1 ranking stands still; a 2 ranking shakes; a 3 ranking struggles; and a 4 ranking goes berserk and tries to jump out the top of the chute.

Identifying cattle with poor dispositions isn't enough; such cattle should be removed from the breeding operation.

"I recommend ranchers get rid of those that get a 4 rating, but don't necessarily select for a 1," Grandin says. "Overselecting for any one trait is a bad idea because those with a 1 ranking may be poor mothers or poor grazers. So just get rid of the 'crazies.'"

Sometimes it isn't enough to watch for how cattle react on a day-to-day basis, as cattle with excitable dispositions may not react to familiar situations.

"Some cattle may seem fine when handled on the ranch in an environment familiar to them. But these same cattle may be more excitable and may be more likely to panic in new situations, such as the auction ring or packing plant. Panic in novel surroundings is a genetic reaction," Grandin says.

More reasons to cull

Meat quality isn't the only reason to select for good disposition. Another study conducted at CSU found that calm feedlot cattle have higher average daily gains (ADGs) than excitable cattle.

Using a temperament-ranking system similar to the one previously described, researchers at CSU ranked 436 steers and heifers at processing and weighing. The research found not only that *Bos taurus* cattle with calmer dispositions gained better than the *Bos indicus* cattle but also that the *Bos taurus* cattle with the calmest temperament gained nearly half a pound more per day than *Bos taurus* cattle earning the higher temperament scores.

"It's also a matter of safety," Grandin says. Cattle with poor dispositions are at higher risk for injuring themselves or their handlers during processing. Excessive excitability creates serious animal welfare problems during handling, especially at auction markets and harvest facilities.

"Cattle that jump and bash in the chute when being handled

are more dangerous, and there have been some accidents at packing plants because of this type of animal," Grandin says.

Handling tips

As the industry continues to focus on providing high-quality meat free of defects and dark cutters, handling practices aimed at minimizing quality problems will increase in popularity. Already, major meat buyers, such as McDonald's Corp., are evaluating handling and stunning practices to ensure the highest-quality meat possible, in addition to improving animal welfare. And evaluations of this sort are not limited to big-time producers and buyers. Ranches and feedlots of all sizes, including Irsik and Doll Feedyard, are taking the time to evaluate their handling practices.

"How do we handle the more excitable cattle? The same way we handle the rest — very carefully," Wohlenhaus says.

And for good reason. Minimizing stress and agitation in livestock has been shown to minimize the incidence of dark cutters and other meat-quality

issues. Grandin recommends producers and feedlot managers acclimate cattle to various situations in order to help them deal with new surroundings.

"Cattle need to be habituated to different vehicles, people on horseback and people on foot," Grandin says. "And when they are first introduced to the new situation, it should be neutral, not negative. You want something good to happen when they are first introduced.

"At the feedlot level, walk the pens instead of only handling the cattle on horseback or in vehicles," she continues. "The ranchers also need to work with the cattle, familiarizing them to new situations."

Grandin says one of the most problematic groups of cattle she had seen at the packing plant never caused a problem at the feedlot. "The problems arose at the slaughterhouse when they were being handled by men on foot because, up until that time, the cattle were only exposed to people on horseback," she explains.

Following some simple management practices can decrease further the incidence of dark cutters and diminished meat quality.

1. Do not commingle strange cattle prior to slaughter at the plant. Fighting increases dark cutting.
2. Handle animals quietly and reduce or eliminate the use of electric prods. However, some lines of cattle are genetically predisposed to resist movement through sorting gates and may require additional convincing to move through the system.
3. Unload trucks promptly.
4. Do not hold cattle overnight in the stockyards.
5. Acclimate cattle to people on foot before they go to the packing plant.

