

BEEF CATTLE PENNING

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Summer has come to an end and cooler fall weather is upon us. With the exception of far west Texas, the summer was extremely dry until August storms from the Gulf started making their way through Texas. Most brought needed rain and little damage. However, hurricane Ike roared ashore on September 13th as one of the largest category 2 storms in history. Galveston took a direct hit and an 8-20 foot storm surge devastated Jefferson and Chambers county cattle operations. Several thousand head of cattle perished during the storm and 15,000 to 20,000 were left with no fresh water and forages. In an effort to save the cattle and ultimately these rancher's livelihoods, "Operation No Fences: Hurricane Ike Horse and Cattle Relief" was initiated and relief supplies started pouring in less than 48 hours after the storm made landfall. Ranchers, industry groups and state agencies joined together and ultimately saved thousands of head of cattle for the ranchers in the region. Recovery in the region will take months if not years. However, glimpses of green grass returning to the area two weeks after the storm provide some hope for ranchers in the area.

Across the state, a majority of the calves have been weaned, the last cutting of hay is being put up and winter is just around the corner. This issue of Pennings will discuss *Bale Weight: How Important is It?*, *Winterizing the Cow Herd*, and *Some Thoughts on Bull Selection*.



Chambers county cattle in hurricane Ike storm surge water 48 hours after the storm made landfall.

“Operation No Fences” distribution center in Anahuac, Texas on September 17, 2008.



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Bale Weight: How Important is It?



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Most beef cattle producers in the state of Texas buy and sell hay by the bale. Although this has been the traditional way hay was traded, we should ask ourselves if there is a better way to trade hay. If you purchase hay that costs \$50 per round bale, shouldn't it matter to you how much the bale weighs and what the nutrient content of the hay is? It should, but unfortunately these are things that are not routinely considered when hay is traded, which is a disservice to both the buyer and seller.

Factors that should be considered when trading hay include: bale weight, nutrient content (i.e. percent crude protein, percent TDN, etc.), forage condition (i.e. free of mold, foreign objects, weeds, etc.), bale shape and density as they affect transportation and storage, forage species, the potential presence of toxic compounds (i.e. nitrates, etc.), and palatability.

In this article we will focus on bale size and density as they impact bale weight and thus feeding and transportation costs. Although the length of this article doesn't allow for an in depth discussion of all factors that should be considered when trading hay, that doesn't mean they are not important and that producers can afford to ignore them.



Bale size for round bales is generally described by bale width x bale diameter (also referred to as bale height). For example, a 5' x 6' bale would be 5 feet wide and 6 feet in diameter and a 5' x 4' bale would be 5 feet wide and 4 feet in diameter.

About now you may be asking yourself why bale size is so important. A 5' x 5' bale that weighs 1,100 lbs has a density of 11.21 lbs/ft³. Assuming that density for all sizes, we can evaluate the effect bale size has on bale weight. Table 1 shows that weights of varying sizes of bales range from 563 lb to 1,584 lb. If you are going to pay \$50 per bale, which bale would you rather buy?

Table 1. Effect of bale size on bale weight and value

Bale width, ft	Bale diameter, ft	Bale volume, ft ³	Estimated bale weight, lbs*	Bale size, % of a 5'x 5' bale	Bale value in relation to a 5'x 5' bale**	Price per ton***
4	4	50	563	51	\$25.60	\$177.56
4	5	79	880	80	\$40.00	\$113.64
4	6	113	1,267	115	\$57.60	\$78.91
5	4	63	704	64	\$32.00	\$142.05
5	5	98	1,100	100	\$50.00	\$90.91
5	6	141	1,584	144	\$72.00	\$63.13

*Assumes all bales are the same density as a 5' x 5' bale that weighs 1,100 lbs.

**Assumes all factors are equal except bale size and weight.

***Price per ton assuming all bales cost \$50 each (the same as a 5' x 5' bale).

In addition to bale weight, Table 1 illustrates the relative size of various bale configurations compared with a 5' x 5' bale. A 4' x 4' bale would only be 51% the size of a 5' x 5' bale whereas a 5' x 6' bale would be 44% larger than a 5' x 5' bale. We can also compare the relative value of various bale sizes. If a 5' x 5' bale is worth \$50, then a 4' x 4' bale would only be worth \$25.60, whereas a 5' x 6' bale would be worth \$72.

The last column in Table 1 further illustrates the importance of buying hay based on weight by comparing the price per ton of hay if the same price was paid for all bales regardless of weight. In this example, 1,100 lb bales purchased for \$50 would cost \$90.91/ton ($\$50 \div 1,100 \text{ lbs} = \$0.04545/\text{lb}$; $2,000 \text{ lbs} \times \$0.04545 = \$90.91/\text{ton}$). In comparison, if you pay \$50 for bales that only weigh 563 lbs then the price for those bales would be \$177.56/ton.

So far in our discussion we have only looked at the impact of bale size on bale weight while assuming equal density of all bales. However, as we know in reality, some bales are tighter (i.e. more dense) than other bales. Table 2 shows us how bale density can affect bale weight when comparing bales of equal size. Would you rather buy the 5' x 5' bale that weighs 935 lbs or the 5' x 5' bale that weighs 1,210 lbs?

Table 2. Effect of bale density on bale weight

Bale width, ft	Bale diameter, ft	Bale density, lbs/ft ³	Bale weight, lbs
5	5	9.53	935
5	5	10.09	990
5	5	10.65	1,045
5	5	11.21	1,100
5	5	11.77	1,155
5	5	12.33	1,210

Our discussion to this point clearly demonstrates the importance of bale weight when you purchase or sell hay, but what about when you raise the hay yourself? If this is your situation, then think about the number of trips and the amount of time it takes you to move hay from your field to your hay lot. Table 3 illustrates that if you produce 11,000 lbs of forage per acre over a hay season and your bales weigh 563 pounds then you would produce 19.5 bales per acre. This may sound good compared with only producing 10 bales per acre that weigh 1,100 lbs each, but hold on a minute. The question you should ask yourself at this point is how many trips it will take you to move the bales from your hay field to your hay lot. If you can only move two bales at a time, then it is going to take twice as long and cost twice as much to move the bales that only weigh 563 lbs compared with the bales that weigh 1,100 lbs.

Table 3. Effect of bale weight on the number of trips required to move hay from the field to a hay lot

Bale width, ft	Bale diameter, ft	Bale weight, lbs*	Forage production per acre, lbs	Bales produced per acre	Number of trips required to move two bales at a time from one acre of production**
4	4	563	11,000	19.5	10
4	5	880	11,000	12.5	7
4	6	1,267	11,000	8.7	5
5	4	704	11,000	15.6	8
5	5	1,100	11,000	10.0	5
5	6	1,584	11,000	6.9	4

*Assumes all bales are the same density as a 5' x 5' bale that weighs 1,100 lbs.

**Assumes that you transport two full sized bales every trip, except the last trip. In reality this will not always be possible.

In addition to considering the impact of bale weight on bale value and transportation costs, consider how bale weight affects how long it takes you to feed and how frequently you have to feed hay during the winter. Table 4 illustrates how many bales you would have to feed per week to 30 cows that consume 33 lbs of hay per day. Would you rather feed 6.3 or 12.3 bales per week?

Table 4. Effect of bale weight on the number of bales needed to feed 30 cows for one week

Bale width, ft	Bale diameter, ft	Bale weight, lbs*	Hay consumed per cow per day, lbs**	Bales needed per week for 30 cows
4	4	563	33.0	12.3
4	5	880	33.0	7.9
4	6	1,267	33.0	5.5
5	4	704	33.0	9.8
5	5	1,100	33.0	6.3
5	6	1,584	33.0	4.4

*Assumes all bales are the same density as a 5' x 5' bale that weighs 1,100 lbs.

**The amount of hay required per cow per day will vary depending on hay quality, nutrient requirements of the cow, and hay feeding losses.

Although we have only focused on round bales in our discussion today, these same concepts hold true for both small and large square bales. Hopefully, these examples have illustrated the importance of knowing how much a bale of hay weighs and how that weight is impacted by both bale size and density.

Winterizing the Cow Herd



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Think about winter and ranching and most folks will probably think about cold mornings spent in the truck delivering feed to bawling cattle. They probably also can't help but think of the significant dollars that they will soon spend "enjoying" that activity. The challenge this winter will be to maximize efficiency for each feed dollar spent.

Where to begin? Estimate the type and amount of supplement that you will need this winter. If you plan on feeding hay, inventory it; and then get it tested so you can predict what kind of supplement may be needed to go along with it (Figure 1).



Figure 1. Hay core sampling

If you depend more on pasture forage, then fall is the time to inventory standing forage. Also, a follow-up forage quality analysis can help target supplement needs later this winter. Sampling forage for quality analysis can be done in mid-winter, or more frequently if conditions change. Certainly by October in many parts of Texas, ranchers will have a pretty good idea about what kind of forage crop was produced during the summer - fall growing period. In cooler regions, fall moisture will determine how much "soon-to- be dormant" forage will be left for winter grazing. In warmer regions, fall and winter moisture will determine how much additional cool season growth might be anticipated. At any rate, plan on spending some time in the pasture this fall estimating the mass of standing forage crop; then estimate what animal demand will be during the winter months (see Extension Publication B-1646; How Much Forage Do You Have?). Time in the pastures this fall will be well spent and can certainly make supplemental feed dollars more effective.

Most herds are worked in the fall; especially spring calving herds. Calves get weaned and it is a convenient time to evaluate the cows. Pregnancy test and cull open females. If you use individual animal ID, check animals for lost tags etc. and plan to up-date pertinent records. Individual ID (ear tags, brands, tattoos, etc), can certainly help with management and marketing throughout the year. Evaluate animals for general soundness: udders, eyes, legs, etc. Don't forget to check the bottom front teeth on cows and bulls. Many animals, especially in sandy areas, will begin to show significant signs of tooth wear, sometimes as early as 7 years-of-age. Others can have solid mouths (Figure 2) well into their teens. Smooth mouth animals (Figure 3) should be culled. Broken-mouthed animals with worn or missing teeth should be evaluated for severity on an individual basis.



Figure 2. Solid Mouth



Figure 3. Smooth Solid Mouth

Consider Vitamin A. Cattle synthesize Vitamin A from green forage and can store it in the liver for up to 3 months. But if cattle will be grazing more than 3 months without access to green forage, then Vitamin A, either as an injection when cows, heifers and bulls are worked at weaning, or incorporated into their feed supplement this winter, would probably be wise. Dormant forage is usually low in phosphorous so remember that, especially for cows. A magnesium mineral is often used to prevent grass tetany in lactating cows that graze winter small grains.

What about parasites? In general, deworming is cost effective as long as the pastures are free from, or low in, worm egg contamination following treatment. If worms are a concern for spring calving herds, it may pay to deworm dry cows if they are going to a clean pasture. Clean (or relatively clean) pastures could be either improved annual pastures, or perennial pastures that have been deferred from grazing for several months (esp. hot summer months). In areas where worms are a concern for fall calving herds, it can often be beneficial to treat suckling calves that are older than 3 months-of-age, even if they are going back to a recently grazed pasture. For best results, use name-brand products for parasite control and remember to rotate classes of dewormers: avermectin, benzimidazoles, imidothiazole (i.e. a white paste or drench vs. a "transparent" product). Liver flukes can also be a local problem in low-lying, moist areas. So if this is a concern, remember to use an internal parasite product with activity on flukes (clorsulon, albendazol, or avermectin + clorsulon). Also, consider external parasite treatments if lice or grubs have been a historic problem in your area.

You may be considering vaccinating for reproductive diseases this fall. This is not ideal for spring calving herds. Most reproductive vaccines (virals and bacterials) work best if they are given about 2 to 3 weeks pre-breeding, and in accordance with label recommendations. If however, your management situation or other factors, are causing you to consider giving these vaccinations to pregnant, spring-calving cows this fall; then it is highly recommended that you first consult with your veterinarian.

It was a very tough summer across a lot of Texas. Recent rains will no doubt help some, but it is normal for many cows to be in slightly less than ideal body condition this time of year. Therefore, fall is an excellent time of year to condition score your herd. This will give insight into what may (or may not) be needed in the way of management in the upcoming months. If dry cows are put on good to fair quality fall forage, then most will gain some weight and enter their winter supplementation period in a "maintenance mode". If however, forage quality is still questionable this fall, and/or the ability to gain weight after weaning is likewise questionable, then consider fall supplementation. Often weight can be added more economically and with less supplement, to a dry cow in mid-gestation (fall) vs. a late-gestation cow (winter). This is because by winter-time, a spring-calver requires extra nutrients for her larger, rapidly growing, pre-natal calf. That situation is typically compounded by more stressful weather and poorer quality winter forage. All this adds up to a less efficient use of supplement for the purposes of winter weight gain. Another way to use fall body condition scoring is to consider splitting the herd into groups tailored for supplemental feeding needs. Each group would be fed (or not fed) according to their projected weight gain (body condition) needs going into winter.

In summary, fall is a great time of year to evaluate both animals and pastures. Plan accordingly, because high input winter months are just around the corner.

Some Thoughts on Bull Selection



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Soon it will be time to consider purchasing new bulls to replace some of the older ones across the state and ranchers that haven't decided on a genetic strategy can be inundated with data. The first thing you should consider is why you have a bull. Is it to just produce calves? If so then any bull will do as long as he is fertile and interested. If you are planning on improving your calf crop for market or replacements, then you have a little more work to do.

You will need to consider the genetics of your cowherd, especially for size and milk production and maybe color, and in many areas of the state the level of *Bos indicus* influence. *Bos indicus* cattle are and have been getting dinged for a lot of reasons, many unjustified. What they can bring to the cowherd is longevity, disease resistance, parasite tolerance, high heat and humidity adaptability, and reduced nutrient requirements. Even if you don't have these genetics in your cowherd, you can still get hybrid vigor for growth in your calves by using a bull of a different breed than your cows.

Most cow calf producers sell their calves at weaning so the most important trait to consider in a bull is growth, an actual or adjusted yearling weight or preferably a yearling weight EPD. This selection for yearling growth should be balanced by a birth weight or birth weight EPD to indicate calving ease (or a calving ease score or EPD). Heavy calves are important but they have to be born first. This is less important in mature cows than in heifers and less important in *Bos indicus* cross females than *Bos taurus* (straightbred or crossbred) cows.

If some replacement heifers are to be saved, then size and milk production as well as calving ease are all important. Again having live calves is paramount but then they need to grow and the daughters need to milk. Bulls used to produce a few replacement heifers as well as market calves cannot be as extreme in size or growth potential as bulls selected to only produce market calves. Selection for increased scrotal circumference in young bulls will reduce the age at puberty in his offspring and may enhance fertility.

Bulls that are offered for sale will run the gamut of having every record conceivable to none. One record that is important to know is if the bull has passed a recent Breeding Soundness Exam performed by a competent veterinarian. The BSE will indicate that the bull is fertile and capable of breeding but not that he is interested. You should observe the bull checking heat and mounting cows to ensure that. Beyond that, you need to pay attention to those records (or traits with records) that make you money.

Young bulls are often overlooked in our part of the country in favor of older bulls that are considered tougher and more developed. The genetics of younger bulls are just as good and are often better than the genetics of older bulls. Younger bulls have less development cost in them and not as picked over by other bull buyers and offer some inexpensive but good genetic choices. Often younger bulls get turned out with older bulls and they get hurt or breed fewer cows than the dominant older bulls. If you plan on using younger bulls, consider letting them breed in a group by themselves.



One question often asked is how many cows should I breed my bulls to (especially young bulls)? Usually that will depend on your cowherd size, about 35 cows is the upper limit for mature bulls and even then that needs to be a fertile and interested bull. Many parts of the country use 20-25 cows per mature bull because of the terrain, pasture size or conditions. I have heard my colleagues say that very young bulls, less than 24 months, should only be bred to as many cows as the bull's age in months (e.g. an 18 month old bull could handle 18 cows). I haven't ever been able to track down the research that supports that but it is probably a sound approach. I wouldn't use a bull less than 18 months old on very many cows period.

Besides selecting bulls with good genetics for calving ease, growth and milk production (when replacement heifers are kept), bulls should be structurally sound. A good bull should last you for at least 5 years of productive service and one of the most cited reasons for bulls being culled is that they have broken down in their feet and legs. Watch bulls walk naturally. The top of their back and hips should be level when they walk and their hindfeet should be placed in the hoofprints of their forefeet. They need to be up on their pasterns (the part of the leg above the hoof that would correspond to an ankle). That is one of the easiest ways to observe structural correctness.

Everyone wants a "cheap" bull. I think that bulls that have more bells and whistles (bulls with more desirable records, temperament, etc) ought to be worth more and usually are. It is important to remember that all bulls (and cows) have salvage value and some estimate needs to be made of it to determine how many additional dollars in calf crop value (number of calves, weight of those calves, and value of those calves) the bull needs to provide to pay for himself. In addition, bulls have to be maintained just like the cows do (only better I hope) and the bull's annual maintenance cost is about 150% of the cow's. Usually this maintenance cost is part of the "breeding cost" assigned to cows. The more cows a bull breeds, the lower this costs per cow which is one way to cut cost without cutting production!

I think it is also important to consider where you buy your bulls. I like to see bulls on their home country but that means a lot of time and driving and we all know what fuel costs nowadays. Consignment sales are also good sources of quality genetics. Some sales only offer one breed while others offer several choices. I would recommend you spend a little time before the sale with the catalog looking at the bulls you are interested in and visiting with the owners who consigned them. Chances are if the bulls they have at that sale don't interest you, maybe they have something at home that will or they know someone who does. Bulls sold at these sales are all guaranteed sound and breeders so there is little chance of getting a nonbreeder. When you go, decide exactly how much you want to pay for your new bull(s). Often we all get "auctionitis" and keep bidding beyond what we can reasonably expect as a return from our new bull.

I realize that this might not be all the things you might think about before you purchase a bull or several bulls but hopefully it made you think of a few things that you need to consider or reconsider before that next capital investment and you might be willing to pay a little more for that bull that is a better fit for your program!

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