LIVESTOCK AND NATURAL RESOURCES

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PUT FIRST THINGS FIRST

The following article draws heavily on a beef cattle nutrition school I attended. This excellent school will challenge your assumptions and provide new alternatives to consider. I have a few brochure copies available at my office. You can also contact: Low Cost Cow/Calf Production School, taught by Dr. Dick Diven, at **(800) 575-0864**.

If you are a cow-calf producer, what is you number one objective? My response is to produce a live calf every year. In order to produce that live calf, I have to get the cow to conceive. Another way of looking at it — *you have to get the cow bred or you are toast.*

Did you know you only have 85 days after birth to achieve conception? If we assume a 280 day average gestation period, then 365 days in a year minus 280 days gestation = 85 days.

After birth, a post partum interval occurs. The interval is the time between calving and when the cow starts to cycle normally. During this time, the reproductive tract heals itself and hormonal balance is restored. Short estrus cycles *(false heats)* may also occur where an egg is produced and fertilized, but the cow is not capable of maintaining the pregnancy.

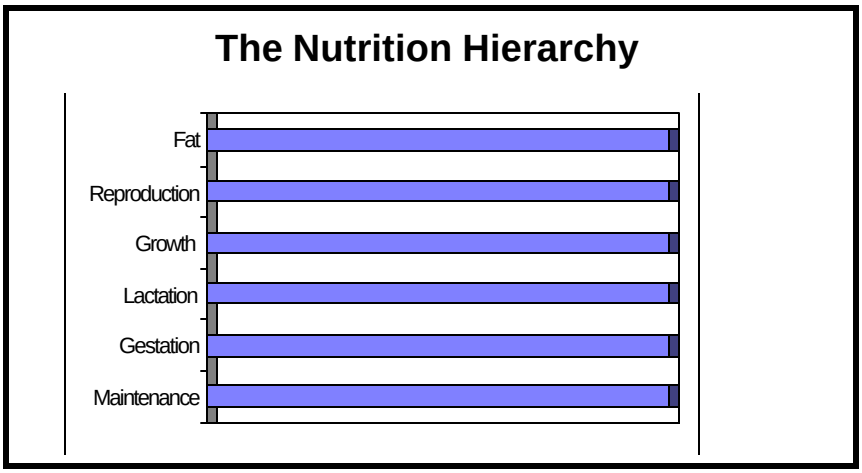
The reason for this is that nutrients consumed need to go towards reproduction. There is a demand hierarchy illustrated in the chart below that determines what is done with food the animal consumes.

Maintenance requirements must be satisfied before any nutrients can go towards supporting gestation and so on. You should note that reproduction is the next to last thing. All other requirements must be met first. If we want a calf every year, we better make sure our cow is in a good nutritional state. Otherwise, it may be more difficult to get her bred.

BREEDING SEASON

We control the breeding season. We decide when to turn the bulls out and when to gather them back up. The range normally is between 60 to 365 days. Dr. Diven points out that we rarely consider a planned 45-day or less breeding season. The amazing part is that the EFFECTIVE part of most breeding seasons is less than 45 days.

The chart on the next page visually shows the changes that occur when most of the calves are born during a 63-day breeding season. Assuming all cattle are fertile and have experienced two or more normal cycles prior to breeding the first year, most of the cows will get pregnant during the first four weeks. By the second year, most get bred from the third to sixth week. This moves from the



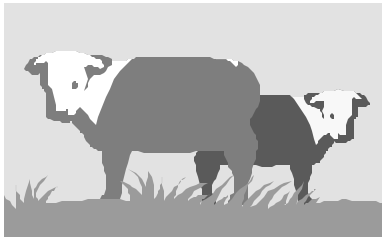
fourth to the seventh weeks by year three. If we continue the trend for more years, eventually all the cows would be getting bred in the last 45 days or so of the breeding season.

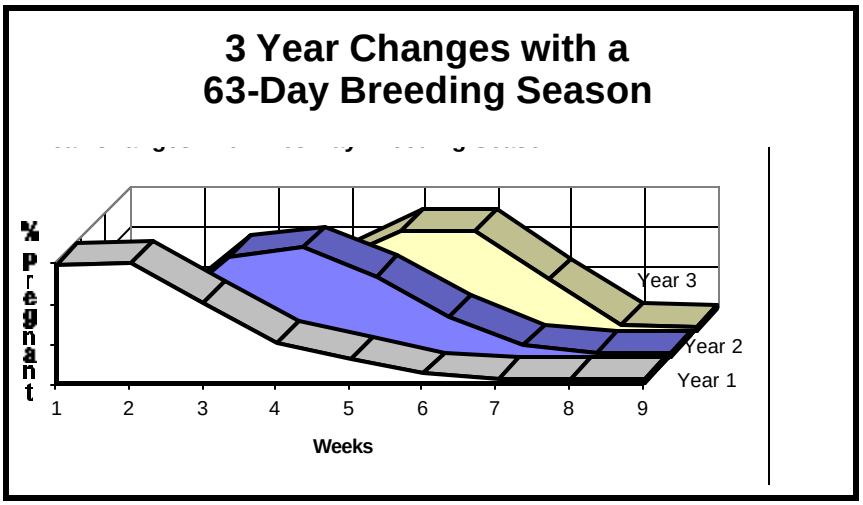
The reason this occurs is that those cows that calve in the latter part of a 63-day or longer breeding season are not capable of conceiving any earlier the next year. Some of those calving midway through the breeding season will calve later in subsequent seasons. Also, the length of the post partum interval affects the ability to rebreed.

Since the trend is for the cows to have a 45-day breeding season, why not get set up for it? You may be saying to yourself ***"Is he crazy , there's no way I could do 45 days."***

Well, just to push the envelope a little more, Dr. Diven's dream would be to have calving done in a 21-day period. We are not as far from doing that as you might think. The keys to doing this are — calving cows in suitable condition and calving at optimal time for your latitude.

STORED FAT — ONE KEY TO SUCCESS





Body condition scores (BCS) are numbers used to suggest the relative fatness of the animal. Scoring systems I am aware of have been developed for cattle, sheep, and horses.

Scores range from 1 *(Very thin)* to 9 *(Very fat)*. The table on page 3 describes the different scores and how they are grouped for cattle. It's not brain surgery. Thin cows looks sharp, angular, and skinny. Bone structure can be seen and felt. Fat cows look smooth and boxy with the bone structure hidden from sight or feel. All others fall somewhere in between. A cow with a BCS score of 5 should look average, neither thin nor fat.

Protein and water exist in the animal's body in rather fixed relationships. As the percentage of fat increases, the percentage of protein and water will decrease *(see Table 2 on page 4)*. Fat is the major component in the gain or loss in body condition. Stored fat can be used as a no cost supplement to keep feed costs down.

Researchers have reported a strong positive correlation between condition scores and the percent body fat of animals. A BCS 3 will be less than 15% fat. BCS 7 will be more than 31% fat. The variance is body fat is about 8% between scores.

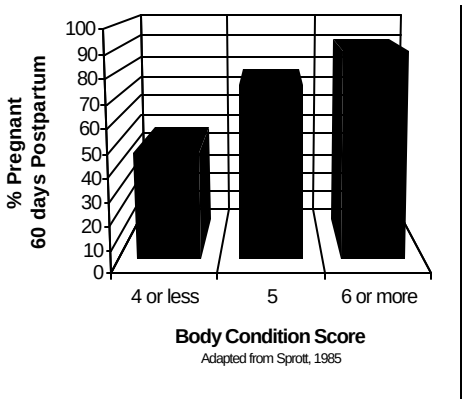
Why Do It?

Earlier we discussed the importance of conception to the cow-calf producer. One critical component determining conception is the condition of the cow at calving *(see graph on page 3)*.

Many of you may have heard and/or practice body condition scoring with your herd. Some people who have tried it get frustrated because everybody seems to come up with a different score.

It is easy to develop an attitude of *'what good is it if there is no right answer?'* Even with variation, scoring is not likely to vary more than one score between individual scorers.

Effect of Body Condition at Calving on Pregnancy Rate



I would like to encourage you to develop your skills with regards to body condition scoring. It is one of the most important management tools you have. In addition, the price is right – FREE. It just takes practice – the more you do it, the greater the accuracy.

How Do You Do It?

When first starting out, you should use visual appraisal and physical touching of the animal. No one singular approach works with body condition scoring.

With animals you are unsure about, it may be helpful to see the animal move off. It can be combined with another activity such a pregnancy checking, vaccinations, etc.

The table below describes the different scores. In order to determine scores you need to: feel along the shoulder, backbone, edge of the loin, ribs, hooks and pins, and the tailhead *(see Figure 1 on page 4)*. Thin cows will show little cover. You will be able to see bones under the skin and readily feel them. Moderate cows will feel more spongy and you will not readily feel bones. They will be more rounded in appearance over the back. Fat cows will be rounded over the back and there will be fat along the tailhead.

Remember, not all animals distribute fat in the same manner. Some may have a lot of fat along the ribs, but little over the back or vice versa. The more you do, the better you will be able to take individual differences into account.

When doing body condition scoring, invite two or three friends over and have everybody individually determine a score and then compare. You will learn from each other. Do not let one

Table 1: Body Condition Scores

BCS	APPEARANCE	DESCRIPTION
1	**Emaciated**	Cows are extremely emaciated with no palpable fat detectable over the back bone, loin, edge of the hip bones and ribs. Tailhead and ribs project quite prominently.
2	**Poor**	Cows appear somewhat emaciated. The backbone and ribs are prominent. The tailhead, ribs and pins project prominently but there is some tissue cover along the spine.
3	**Thin**	Ribs are individually identifiable, but not sharp to the touch. There is obvious palpable fat along the spine and over the tailhead but no fill in the brisket.
4	**Borderline**	Individual ribs are no longer visually obvious. Individual vertebrae of the backbone can be identified individually on palpation but feel rounded rather than sharp. Some fat covers the ribs, edge of the loin and hip bones.
5	**Moderate**	Cows have good overall appearance. Fat cover over the ribs feels spongy. The area around the tailhead has palpable fat cover.
6	**High Moderate**	Firm pressure must be applied to feel individual vertebrae of the backbone. A high degree of fat is palpable over the ribs and around the tailhead. The brisket is starting to fill out.
7	**Good**	Cows appear fleshy and obviously carry considerable fat. Very spongy fat cover over the ribs and around the tailhead. "Rounds" or "ponies" becoming obvious. Some fat around vulva and in crotch.
8	**Fat**	Cows are very fleshy and over conditioned. The backbone is almost impossible to palpate. Cows have large fat deposits over the ribs, around the tailhead and below the vulva. "Rounds" or "ponies" are obvious.
9	**Extremely Fat**	Cows are extremely wasty and patchy and look blocky. Tailhead and hips buried in fatty tissue and "rounds" or "ponies" of fat are protruding. Bone structure no longer visible and barely palpable. Animal's mobility may be impaired by large fatty deposits.

Table 2:

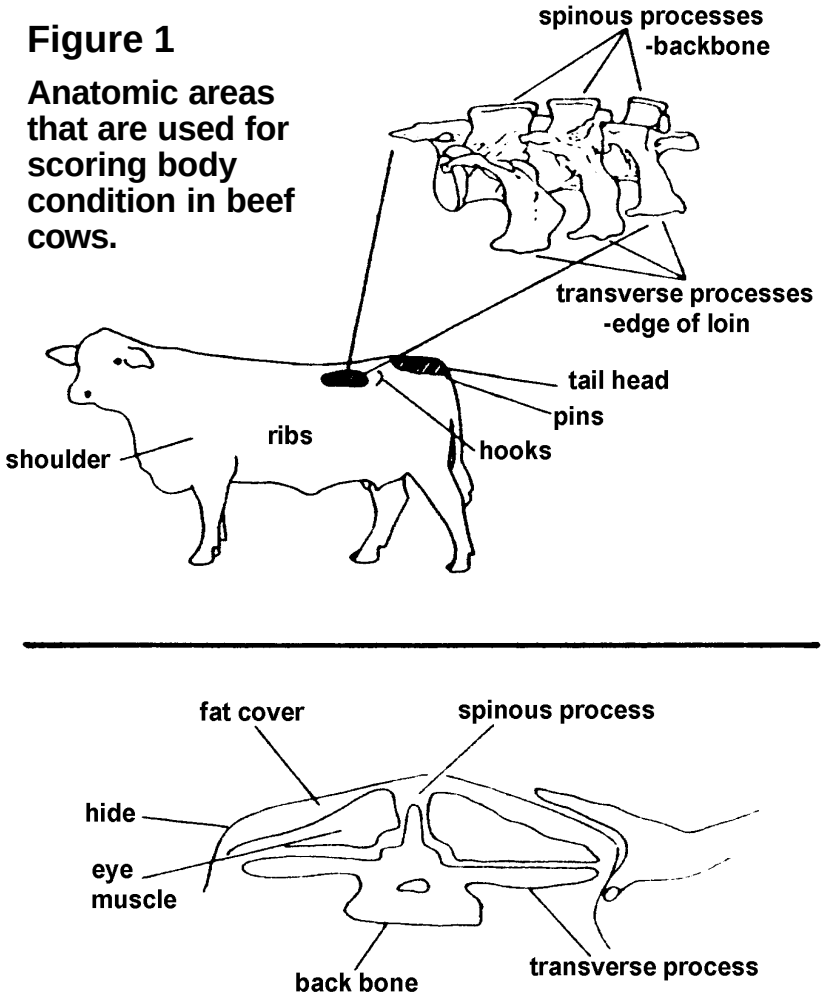
Effects of body condition score on body composition and composition changes assuming an 1,100 pound cow at body condition score of 5.

BODY CONDITION SCORE (BCS)	3 (THIN)	5 (AVERAGE)	7 (FAT)
Live Weight, pounds	946	1,100	1,284
Composition of Empty Body **(a)**:			
Total Weight, pounds	843	980	1,144
Fat, pounds	8%	16%	24%
Protein, pounds	20%	18%	17%
Water, pounds	67%	61%	55%
Mineral, pounds	5%	5%	4%

(a) Empty body weight is the live weight less the contents of the digestive tract.

Figure 1

Anatomic areas that are used for scoring body condition in beef cows.



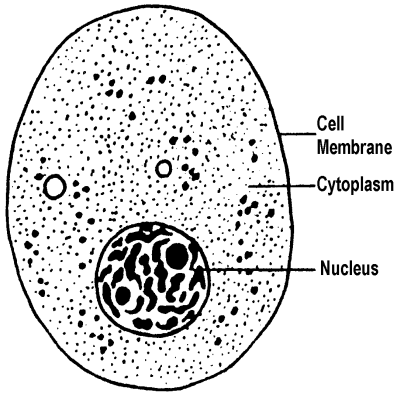
person determine how you will score the cattle. Work together as a team. After all, there is no absolute right or wrong answer.

Calibrate what you are doing by running a few head through and scoring them. Then run them back through the chute and score them again to see how consistent you are. Keep doing small groups of say five head until you begin to develop some consistency.

Part of this section was adapted from Texas Ag Extension Service publication B-1526, ***Body Condition, Nutrition, and Reproduction of Beef Cows*** by D.B. Herd and L.R. Sprott.

GROWTH FROM A DIFFERENT PERSPECTIVE

You may think of growth as changes in body weight and physical size of the animal. However, growth is really occurring due to cells.



A single cell, many times its actual size.

There are two forms of growth: **cell multiplication** and **cell enlargement**. *(See diagram at bottom of page 4.)* Formation of cells begins with conception and concludes shortly after birth. Cell formation occurs at an exponential rate. We start with two and keep going until there are billions of cells at birth *(If only money could compound at the same rate!)*.

Cell formation keeps going after birth, but some have suggested that it stops in as few as 13 days! Cells are still formed thoughout the animal's life for blood, skin, hair, and digestive tract organs. Just keep in mind that the little 13-day-old calf on the ground pretty well has all the cells it will ever have!

This is a critical period of growth. You do NOT want the calf to experience any kind of starvation at this time. If it does, cell formation will be limited and specialized cells such as nerve and muscle will not fully develop. Make sure you have plenty of milk!

Cell enlargement starts at conception and keeps on going until mature body size is reached. All the cell are full. Cells fill *(weight gain)* and empty *(weight loss)* throughout life. Cattle gain weight with high quantity and quality forage and lose weight on poor quality forage. Cells, especially fat ones, serve as storage for excess nutrients in good feed periods. The animal can then draw on these reserves during poor feed conditions.

Roy Batt, Royal Veterinary College, looked at growth of various tissues and the age at which they occurred. He referred to growth as waves that occur from conception to maturity. The order in which these waves occur include: nervous, skeletal, muscle, and fat. Even though we have most of the cells after 13 days, intramuscular fat cells do not happen until around 65% of empty mature body weight. It is at this period that cell differentiation occurs in the muscle. **Cells either become connective tissue or fat cells.**

This is another critical area of growth. We want the animal on a rising plane of nutrition when it is at 65% of empty mature body weight so fat cells will form in the muscle. If the animal is losing weight or just maintaining itself at this time, less fat cells and more connective tissue will form in the muscle. NOT GOOD! The rising plane does not have to be much, say four pounds of gain in a month — but it does need to be rising.

You might think of the muscle as a dry sponge. If connective tissue is formed, the sponge can not absorb very much *(see to right)*.

Conversely, if fat cells are formed, the sponge can absorb quite a bit. A fat animal can store 10% of its total fat in the muscle.

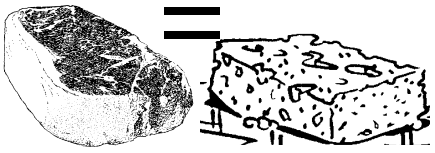
Animals that have the ability to store fat can be strategically managed to draw on these reserves when feed energy is short as well as postpartum recovery. Animals with mostly connective tissue do not have this flexibility. This ability to store fat cannot be seen or felt. When selecting replacement heifers, it is a good idea to inquire about their nutritonal history.

FUN IN THE SUN — THE OTHER KEY TO SUCCESS

Animals are sunbathers! The sun plays an important role with regards to reproduction. The amount of daylight is referred to as photoperiod. Many wild animals are seasonal breeders who use photoperiod as the indicator for cycling and breeding. We have tended to select away from this with domestic animals to the point that we can breed or calve on any day of the year. Despite these efforts, there seems to be sensitivity to photoperiod for reproduction.

The chart on the following page shows the effect of photoperiod on post partum interval *(time between calving and normal cycling)*. The 40º north latitude is roughly where Redding sits. Postpartum intervals are shorter in summer and longer in winter. Photoperiods vary with latitude– you need to know where you are located.

Photoperiod interacts with body condition score. At 40 degrees north latitude, postpartum interval increases at BCS 5 or 5.5 and decreases at BCS 7. It is because of this interaction that you can not make the blanket statement of



being in BCS 5 at calving. Maybe it needs to be 5.5 or 6 or 4.5. It depends on your location.

For Example:

Rancher Roger has a ranch at 40 degrees north latitude and a 100 cows at body condition 6. Rancher Roger is calving in January – a month with 550 minutes of photoperiod. His conception rate is currently at 85% or 85 cows. A Kentucky heifer study observed that conception rate is increased by 21% when two normal cycles precede the big romantic moment *(Patterson et al, 1992**)**.* If we extrapolate this to cows, we can look at the impact of photoperiod on Rancher Roger's operation.

- *100 cows calving in January. Current conception rate is 85%.*
- *Length of postpartum interval at 40 degrees north latitude with BCS 6 cows = 75 days*
- *Number experiencing one pre-breed cycle equals:* **[(85 - 75) ¸ 21] ´ 100 = 47.6%**
- *Number experiencing two pre-breed cycles = 0*

Now let's see what happens when we switch to calving in July *(890 minutes of photoperiod)*.

- *100 cows calving in July. Current conception rate is 85%.*
- *Length of postpartum interval at 40 degrees north latitude with BCS 6 cows = 34 days*
- *Number experiencing one pre-breed cycle equals:* **[(85 - 34) ¸ 21] ´ 100 = 242.9%**
- *Number experiencing two pre-breed cycles equals:* **[(85 - 34) ¸ 42] ´ 100 = 121.4%**

In other words, all of them experience two pre-breed cycles. If two pre-breed cycles result in approximately a 20% increase in conception rate then:

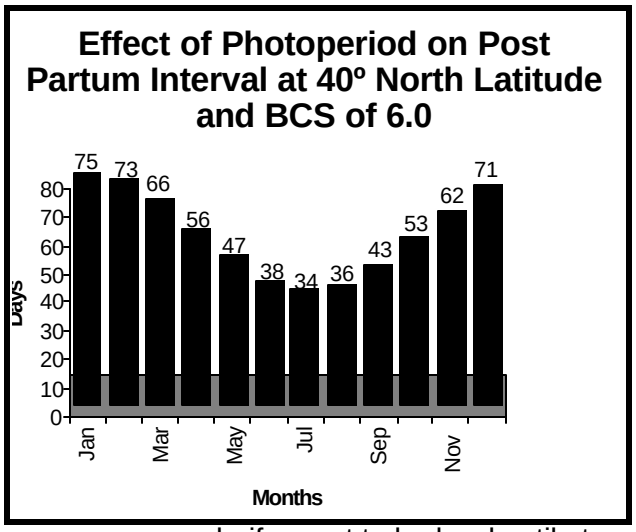
85 head + 20% increase = 85 + 17 = 102

(All right – we only have a 100, but you get the idea).

Am I suggesting we all change to calving in July? It's not an easy question to ask and the answers can get complex. There are a number of different factors to take into account when determining when to calve. I will venture to say that very few of you have taken photoperiod into account in determining your optimum breeding season.

Photoperiod also has an effect on puberty. Heifers born in late spring and early summer will be sexually mature two and one-half to three months younger than those born in the winter months.

This extra time allows those heifers not to be bred until at least their third post pubertal estrus. Those born in winter will still be sexually mature at breeding. However, breeding would start at their first pubertal estrus. The odds for success are 20% less.



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