Body Condition Scoring in Beef Cattle, is it really important?
Matthew Burns, PhD. – Extension Animal Scientist – Beef Specialist

People can argue what the key to success is for a cow-calf operation, but in my opinion a cow giving birth to a healthy calf every year is a defining characteristic of success. Although, being a reproductive physiologist by trade, I may be somewhat biased. The reality is we all strive to be profitable in the beef business, and pounds equal dollars. Our herd health, mineral, nutrition, and grazing programs are designed to promote higher reproductive efficiency and provide us with more pounds.

As a whole, the decisions and investments we make on our operations today can affect us over a 10-year period or longer. It is very difficult to measure short-term success from day-to-day management decision being made. We can easily lose ‘the forest for the trees’ or ‘the herd for the cows’. However, there is one very quick and easy production measure that we as cattleman can record and analyze to evaluate the impact of some of these short-term decisions: Body Condition Score (BCS.)

(Continue reading on next page)
A poor BCS or changes in an animal’s BCS can be indicative of several things:

1. nutritive quality of forages she is grazing or the feedstuffs you are supplying,
2. potential health concerns with regard to infection, parasite load, lameness, or subacute/chronic problems that do not present with obvious signs, and
3. other environmentally-induced stressors such as heat stress or fescue toxicosis.

Keeping good records and monitoring a cow’s and herd’s BCS over time will help to identify problems with individual animals or overall herd-management concerns.

With spring breeding seasons just around the corner, now is the time to make plans and prepare. We have many tools at our disposal to aid us in preparation for the upcoming breeding season. Body condition scoring in beef cattle is one of these tools that we as cattlemen tend to underutilize. One may even ask, what is body condition scoring? A cow’s body condition score is a numerical value from 1 (severely emaciated) to 9 (very obese) that reflects overall condition or fatness of the animal (BIF guidelines, 9th edition). According to the NAHMS survey, only about 35% of beef cattle operations in the United States utilize body condition scores to aid in management decisions. This is surprising when you consider what body condition scoring can tell us as producers. In addition to the issues stated above, BCS can have a profound impact on reproduction. Numerous studies have shown the impact of body condition scoring on calving interval (Figure 1), cycling status (Figure 2), and pregnancy rates (Table 1).

![Figure 1. Calving Interval (days) in response to body condition score. (Patterson, 1993) Cows that are in good body condition (BCS 5 to 6) are able to cycle back and conceive sooner than cows that are under- or severely over-weight. Having a calf every year (or a calving interval ≤ 365 days), increases a cow’s longevity in the herd and profitability for the producer.](image1)

![Figure 2. Percentage of cows cycling at various body condition scores (Stevenson et al., unpublished data). If a cow does not have enough energy reserves in her body, her physiological processes will not function normally. With reproduction almost last on her list of priorities, even a cow’s estrous cycles are likely to be negatively impacted by a low body condition score.](image2)

Table 1. Birth weight and reproductive performance of first-calf beef cows as affected by body condition. (adapted from Richards et al., 1986)

<table>
<thead>
<tr>
<th>BCS</th>
<th>No. Cows</th>
<th>Calf Birth Weights</th>
<th>% Pregnant by Days of Breeding Season</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 Days</td>
</tr>
<tr>
<td>4</td>
<td>73</td>
<td>64</td>
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</tr>
<tr>
<td>5</td>
<td>107</td>
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<tr>
<td>6</td>
<td>60</td>
<td>71</td>
<td>47</td>
</tr>
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</table>
Body condition scoring continued...

So, it is clear that body condition score of cattle impacts reproductive success. If you would like to learn how to body condition score, or just want to brush up on your skills, I have included the guidelines for each numerical score (Table 2).

Interestingly, the standards that we use to evaluate BCS nation-wide today were established by Clemson University in a 1986 Journal of Animal Science publication.

When assessing a body condition score it is important to look at fat cover in the following areas; ribs, tail head, spinous processes, hooks, pins, brisket, and shoulder area.

For those of you that like to utilize technology or need pictures to reference, search for BCS applications for smart phones and tablets. As is the case with most things today, “they make an app for that”! If you have any questions about BCS or beef cattle production please feel free to email me at burns5@clemson.edu.
It seems South Carolina went from autumn straight to spring! Other than a few below average temperatures in December and a quick dose of snow for the northern part of the state in early January, this winter was warmer than average. February 2017 is now in the record books as the warmest in history for Greenville, Columbia and Charleston.

Growing up on an apple farm in Hendersonville, NC, I witnessed first-hand how much stress an early spring can put on a farmer. Each year I saw my Dad naturally worry about his crop and pray for good season. That's how I became a meteorologist. I wanted to know the science behind the weather that our livelihood depended on.

An early spring has caused many trees across the state to bloom an average of 3 weeks early in South Carolina. March can bring many sleepless nights for a farmer, worrying over an inevitable late season freeze or frost.

After digging through a few record books I found that prior to 2017, the warmest February months on record for South Carolina, include 1990, 1976 and 2001, were all followed by a cooler than average March. I dug a little deeper and found that a warmer than average February and March has no relation to late season freeze risks. The average last freeze is early March for the coast, and mid to late March for the Midlands and Upstate. Some years South Carolina made it through a warmer than average winter with no late freezes, other years we were not so lucky.

**Warmest February and number of late season freezes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Late Season Freezes</th>
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<tbody>
<tr>
<td>2017</td>
<td>?</td>
</tr>
<tr>
<td>1990</td>
<td>0</td>
</tr>
<tr>
<td>1976</td>
<td>1</td>
</tr>
<tr>
<td>2001</td>
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**Warmest March and number of late season freezes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Late Season Freezes</th>
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<tbody>
<tr>
<td>2012</td>
<td>0</td>
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<td>2007</td>
<td>3</td>
</tr>
<tr>
<td>1997</td>
<td>0</td>
</tr>
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**March 2016 and 2007 when we had late freezes, probably correspond to major crop losses across the state.**

**Outlook**

The outlook for March, April and May is for continued warmth across South Carolina with near to slightly below average rain. While temperatures will be warm overall, we can still get short-lived cold blasts to move through the state.
The 2017 January Cattle Inventory Report was released January 31, 2017. Let’s review what was contained in the report and what that tells us about the market for 2017.

All Cattle and Calves Inventory for the United States was estimated at 93.6 million head, which is 2% higher than 2016 inventory of 91.9 million head. **Beef cow inventory was estimated at 31.2 million head, which is 3% higher than 2016’s estimated 30.2 million head.** The 2016 calf crop is 3% higher than 2015 at 35.1 million head.

Beef replacement heifers were also up. 2017 Beef Replacement inventory was **1% higher** than 2016 at **6.42 million head**.

US Dairy cow inventory was estimated at 9.3 million head, unchanged from last year. Dairy replacement heifer inventory was 4.75 million head, 1% lower than the 2016 estimate.

**2017 marks the third consecutive year that US cattle inventory has increased** (see Figure 1). The rate of cattle herd expansion has been robust since the historic low in 2014.

The cattle inventory report for South Carolina shows different estimates than the national trend. Figure 2 shows the percent change between 2017 and 2016 for several categories. South Carolina’s total cattle inventory was unchanged from 2016 at 340,000 head. **Beef cow inventory was down 3% to 170,000 head. Calf crop increased 6% in 2016 to 148,000 head.**

The surprising numbers from the South Carolina cattle inventory report is the level of Beef Replacement Heifer retention (Beef Cow Repl.) and the number of calves over 500 lbs. Calves over 500 lbs. indicate that some producers held calves and delayed marketing last fall, likely due to low prices. It is not unlikely that several producers held calves hoping for the seasonal price rebound expected after the first of the year. This number, and the level of replacement heifer retention, is surprising due to the drought conditions in the areas of the state with the highest cattle numbers. Producers in the drought affected areas of the Upstate lacked resources (grazing) needed to carry calves and replacement through the winter.

What are some conclusions we can make from the January 1 Cattle Inventory Report? Cow herd expansion is still occurring nationwide. **However, southeastern states (except Florida) showed reductions or no change in cattle inventory, largely due to drought conditions in South Carolina, Georgia, and Alabama.** The rate of cow herd expansion over the past three years has been rapid. Will this continue given the reduction in cattle prices? We would expect the rate of expansion to slow if prices remain lower.
There has been some concern that Diatomaceous Earth (DE) has no real efficacy as an insecticide. I too have had concerns, but yet use it with my own small laying flock. I have done some research in order to find out exactly how DE works as an insecticide and is it practical to use it as an anthelmintic and/or to get rid of external parasites on birds. I came across an excellent review article by Korunic (1998) in the Journal of Stored Products Research and will share some of the insights from this scientific article.

**What is DE?**

DE is almost pure amorphous silicon dioxide. DE comes from diatoms which have been fossilized. So what is a diatom? It is a single, celled algae found in both aquatic and land environments. Diatoms are an incredibly diverse group of plants which contain more than 25,000 species. No two diatoms have the same body shape. About 20 – 80 million years ago (even before I was born) diatoms extracted silicon from water which resulted in a hydrated silica skeleton without any real shape so that when these diatoms died, their skeletons sank and formed a thick layer which fossilized then compressed in a soft chalky rock or DE.

DE is mined then processed. The original state of DE is 50% moisture and the solid layer is primarily silica, alumina and alkalis from clay. When DE is processed the moisture content is reduced along with the particle size. Anyone that has ever worked with DE knows that it is like a fine powder, almost like a flour. One interesting factor is that DE will not explode like flour will when aerosolized since it is not flammable. DE is a GRAS (Generally Recommended As Safe) listed food additive according to FDA. DE can absorb 2-3 times its own weight yet remain free flowing. DE can vary in color, white, gray, yellow, red and has the pH of 4.4 – 9.2, has no smell and after processing has a final moisture content of 2-6%. It is primarily composed of calcium but also contains aluminum, magnesium, sodium, iron, phosphorus, sulphur, nickel, zinc, and manganese. The way DE works is primarily based on its physical properties not its chemical composition. DE particles have small inner pores which have the ability to absorb lipid molecules from the outer cuticle of insects which forces water out of the insect’s body resulting in desiccation. To work properly, DE must be in sufficient concentration in order for the insect to come in contact with it. DE’s efficacy can be affected by temperature, humidity, or moisture content, therefore can only be used in certain grain products as a protectant.

**DE Uses**

DE is used as a food additive to combat insects especially in grains, is a water purifier, helps with the filtration of liquids and in the separation of oils and chemicals. It has been used in swimming pool filters for water clarification, and can be used as a filler in paints, rubber, and paper. DE has been used as a mild abrasive, a drilling mud additive, anti-caking agent and an animal feed additive. Sounds better than beer!

DE is also used as an insecticide by trapping the bodies of the insects as they walk over it, sort of like a Venus Fly Trap, especially insects that have rough surfaces. The DE affects the insect’s waxy coat on the cuticle primarily by sorption which results in the loss of water from the insect’s body, it basically acts like a desiccant. It can also be abrasive to the insect or the insect can just avoid the physical presence of the dust.

DE is mined all over the world and its efficacy against insects depends on the physical characteristics of the diatoms not on from where it comes. One thing to keep in mind is that to register DE in the US there is no need to submit any tests of its efficacy against insects. Often times some of the commercial formulations of DE will contain other insecticides such as pyrethrum, and piperonyl butoxide. DE is most often used to control pests in homes and gardens as well as in stored agricultural products. DE is not harmful to mammals. DE use has seen an increase in use in stored agricultural products since consumers prefer alternatives to grain protectants fearing pesticide residues since some of these commonly used grain protectants have lost their efficacy. DE has an advantage since the real mechanism of DE is that insects avoid its physical presence (through dessication, feel, or avoidance) therefore, it is unlikely insects will develop genetic resistance. DE really works as an insect repellant. Some insects are more sensitive to DE than others. Mites which recover their water loss from taking a blood meal, tend to be more resistant to DE.
Housing for Pastured Swine

Lindsey Craig, Area Livestock and Forages Agent

There are many options when it comes to housing for swine on pasture. Depending on your climate and stage of production for the animal, housing can be minimal to totally enclosed. In the southeast, our hot humid climates and more mild winters allows us to house swine outside almost year-round but does create problems during the peak of the summer when temperatures may be too hot for animals.

Heat can cause issues with the animal such as anestrous and sunburn. Hogs will also reduce feed intake during times of heat stress to help lower their core body temperature. Providing shade during warm months is critical for hogs. During cold months the younger animals have a harder time regulating body temperature if they do not have a dry, clean, draft free area to stay in. Anytime there is stress from the environment it can lead to a compromised immune system meaning more disease susceptibility.

**Confinement vs. Pasture**

There are different levels of confinement that a producer can provide for their hogs. Commercial hog houses are the most confined with animals spending their entire life inside various buildings. The other extreme is to have hogs completely on pasture and outside during all types of weather. In the middle are the operations that have some form of shelter for different stages of life. These producers may provide areas for farrowing mothers to be out of the elements and provide protection for the young until they are weaned. In climates with extreme heat or cold, some kind of shelter to provide shade or wind and water protection is common. The areas will become heavy use areas and should include proper drainage or the ability to be moved to decrease the damage done to that area. The soil may become compacted and the forage growth diminished or destroyed.

Farrowing houses are designed to allow the sow or gilt to stay inside until after they complete farrowing. The house can be opened up to allow the sow or gilt out but keep the young in until they are old enough to climb out on their own. This generally will be about the same time they begin to try foraging for themselves and begin incorporating other foods into their diet. These houses help keep the young pigs out of the environment and allow the sow or gilt to protect them easier from a predator or another pig. Many European countries employ these types of houses in their pasture swine productions. Larger farrowing huts tend to have a lower crush death percentage according to a study by Iowa State. There are a variety of farrowing hut designs to choose from, so producers should research which one might work best for them. Some common ones are A-frame, English style, Quonset, and pig-saver. (Iowa State, 2001. Honeyman)

**Bedding**

The type of bedding placed in the houses is also important. The bedding will need to be cleaned and changed out often and especially between animals that use the hut. Ideally the bedding would help protect the young pigs from the environment by keeping them warm and away from excessive moisture while being dust free and inexpensive. There are a few options that might work for hogs such as low quality hay, straw, or shredded newspaper. The hay would need to be clean of any poisonous plants and mold but may be of lower quality to make it cost effective. The straw should be cheaper than hay and will help provide warmth for the pigs. The newspaper, if found in bulk, could be cost effective as well and will be absorbent. All three types of bedding should be checked for dust and mold and cleaned regularly. There may be niche markets for other types of bedding from different industries. (Iowa State, 2001)

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*Photo courtesy of Jennifer Ruth*
Water & Feed
Proper water and feed areas in a pasture set up is critical. Open water troughs will quickly become areas to wallow and wade in, making them dirty and not an ideal drinking source. There are pasture type watering systems that are usually large enclosed barrels with an opening on the bottom that allow the pigs to drink but not get into the water. The feeders are often the same design so that the feed is not out in the open. Protecting the feed will help it stay dry and free of mold. Also, pigs are very strong and can tip over open feeders and spill feed, which would lead to waste.

Fencing & Shade
Fencing for swine is important. Pigs are incredibly smart and curious animals and they will locate and exploit any weaknesses in a fence. The woven wire fence is usually the best option for hogs as a perimeter fence. This type of fencing will withstand the pressure of the hogs pushing on it and rooting around the bottom. Placing an electric wire around the bottom about 6-8 inches off the ground will serve as further encouragement for the pigs to stay off of the fence. Generally hogs do not like electricity and once they have been introduced to it they respect it. A similar strand of electric fencing can be placed on the outside of the fence again 8-12 inches off the ground. This will help in predator control and discourage wild hogs from coming into your herd. Barbed wire fence or straight electric fencing is not an optimal fence for hogs because they can push the wires apart and climb through. If barbed wire or electric fencing is the only option, then the strands need to be very close together on the bottom, around 6 inches apart for the first four strands, and then can gradually get wider toward the top. The single strand of electric wire or electric net fencing can be used to separate pigs in different paddocks. A polywire is easily put up using step-in temporary posts and can be moved and stored when not needed. (Iowa State, 2001)

Areas for shade should also be provided. This can include man-made shade or access to a wooded area that has decent canopy coverage. The hogs will spend a considerable amount of time in these areas as the weather gets warmer, so it is a good idea to have the ability to move the shade from area to area or move them around in the wooded area to minimize the overall damage done to the environment. According the University of Georgia, hogs need about 20 square feet per sow, 40 square feet per boar, and 4-8 square feet for weaned animals depending on size in a pasture setting.

Having movable areas of shade and housing can lessen compaction and erosion issues. Anytime a structure stays in one place then heavy use area materials should also be incorporated into the design. Areas for feeding and watering may become very wet and muddy which can lead to disease. Heavy use areas are often laid out around one central point such as a watering facility. The area around that central point is dug down several inches (4-6) and then a layer of geotextile fabric is laid down.

On top of this fabric, crush and run gravel is layered. This type of material will allow for extra drainage. One thing to consider is having small enough gravel on top to ensure even footing for the animals.

Whatever type of housing you choose for your operation, make sure it's something that you can manage. Keeping the pig's environment clean will help keep the pigs healthy.
Healthy Pasture, Healthy Horse
Cassie Wycoff, Area Livestock Agent

Horses evolved as grazing animals, well adapted to eating high-quality grasses and forages; therefore, these forages should be the foundation of any horse’s feeding program. A forage diet provides energy, protein, minerals and vitamins in various levels, and equine diets need only be supplemented when these nutrients are deficient. A diet comprised primarily of forage can help combat many digestive and behavior-related disorders and is more cost-effective than feeding pricey concentrates.

Horses will consume approximately 2 percent of their body weight per day in forage dry-matter. If the major nutrient source is pasture, a 1000-pound horse will collectively consume and waste approximately 3 tons on average of forage dry matter during a typical 6-month grazing season. Alternatively, you can imagine what these forage-consuming machines will do to your feed budget if all of this was provided in the form of hay. Luckily many of our favorite “pasture ornaments” and “weekend warriors” can be maintained on quality pasture alone. During the growing season, hay and concentrate feeding can be drastically reduced, and even eliminated, in these low-maintenance horses with access to productive pastures. South Carolina has a very good climate for growing high quality forages, but management is key.

Most horse farm layouts allow the herd uninhibited access to their entire pasture or paddock, which is termed ‘continuous’ grazing. Although there’s nothing wrong with this management style (and who doesn’t like to look out and see the horses running and playing across a wide open field?), we may be shooting ourselves in the foot as far as pasture management (and our wallet) goes. When continuously grazed, the horse’s grazing behavior often makes managing our pasture forage quality and utilization more difficult. Since horses prefer young immature plants, when given a choice, they repeatedly return to the same areas of the pasture to graze the tender re-growth. This behavior, as well as the avoidance of elimination areas, create overgrazed ‘lawns’ and under-utilized ‘roughs’. These overgrazed areas then open the door for dreaded (and sometimes poisonous) weeds to move in and take over, further reducing our pasture productivity.

"If the major nutrient source is pasture, a 1000-pound horse will collectively consume and waste approximately 3 tons on average of forage dry matter during a typical 6-month grazing season."

Rotational Grazing: A Tool in Pasture Management

While it does require more management, rotational grazing can result in greater forage growth and overall productivity, which means feeding less, or ideally no hay, during the growing season. A rotational grazing system is usually composed of a drylot or sacrifice lot with several pastures attached (recommended drylot space is 400-1,000 square feet per horse). Rotational grazing systems ‘work’ because they give each pasture an opportunity to rest and re-grow.

Continued on next page...
Managing for Quality

As grasses mature, their composition changes and they become more fibrous, a structural characteristic of the stem that allows the plant to grow upright. Over-matured forages are less preferred by horses, have decreased digestibility, and restricted protein availability. By managing the grazing system, we require the horses to be less selective, forcing them to graze all areas of the pasture before the roughs reach unwanted maturity levels. We also protect the re-growth from being grazed through the creation of rest periods. Additionally, if pastures are mowed after each grazing rotation, similar plant growth, maturity level, and therefore grazing preference, can further be maintained. Dragging manure piles, another good pasture management practice, also helps distribute the nutrients across a larger area, thereby eliminating the areas your horses find undesirable to graze.

Under typical rotational grazing systems, all of the horses in a herd will be allowed to graze the first pasture when the grass is at optimum height and are removed when grass is grazed down to acceptable levels. Once grazed down, the horses will be moved to the next pasture. It is important not to let the pasture become overgrazed, otherwise the overall stand will be weakened, damaging root reserves and increasing re-growth time. The length of time spent grazing each pasture will be determined by forage growth and grazing intensity, not the calendar. Fescue may need as little as 2 weeks of rest during spring, and as many as 5 to 7 weeks during hot, dry weather. In spring, when pasture growth exceeds consumption, speed up the rotation or cut the excess for hay. If pasture re-growth is not quick enough for the rotation, utilize your sacrifice area for turnout and provide hay until the next pasture has sufficient growth for grazing.

Spring rains are great for forage growth, but tough for avoiding mud when animals are involved. When horses are out on wet pasture, the tearing action of their hooves rip up grass and create damaged muddy areas. In this case, it is best to house horses in the drylot until conditions improve.

Take caution with lush spring forage growth. As with any change in feed or feeding routine, it is necessary to gradually adapt you horse(s) to new, lush pasture, to avoid conditions such as colic or laminitis.

For more information feel free to contact cwycoff@clemson.edu.

Tips for Optimal Pasture Health

<table>
<thead>
<tr>
<th>Tips for Optimal Pasture Health</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divide</td>
<td>• Dividing current pastures into at least two or three rotations forces horses to be less selective and graze all available forage. • Using polywire and step-in posts for divisions can be a cheap method to maximize forage utilization and cut feed costs.</td>
</tr>
<tr>
<td>Monitor</td>
<td>• Keeping forage at a 3 inch minimum protects the root system and carbohydrate reserves for faster regrowth • Looking ahead can help you plan current and future forage needs • Maintaining forage cover reduces erosion, weed competition, and protects soil from moisture loss, compaction and temperature fluctuations.</td>
</tr>
<tr>
<td>Mow</td>
<td>• Keeps all plants in similar stage of maturity • Encourages uniform grazing • Prevents weeds forming seed heads</td>
</tr>
<tr>
<td>Drag</td>
<td>• Spreads important nutrients in manure across field • Disperses manure, helps reduce parasite concerns • Prevents piled manure from killing grass beneath it</td>
</tr>
<tr>
<td>Weed Control</td>
<td>• Chemical herbicides to eliminate weeds that survive mowing can be sprayed while horses are grazing other pastures • Done only if needed</td>
</tr>
<tr>
<td>Fertilize</td>
<td>• Replenishes nutrients necessary for plant growth • Lime keeps soil pH closer to neutral, optimal for nutrient absorption</td>
</tr>
<tr>
<td>Rest</td>
<td>• Allows plants time to re-grow following grazing • Prevents complete depletion of nutrients stored in grass roots</td>
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