Beef Cattle Anatomy

Hillary Pope
Cloverbud Objectives

Upon completion of the beef anatomy unit CLOVERBUD 4-Her’s 8 years & under) will be able to:

• Understand the basis of anatomy
• Identify the major bones in the skeletal system
• Identify the digestive system
• Understand the differences in body conditioning scores
• Identify the differences in body conditioning scores
Junior Objectives

Upon completion of the Beef Anatomy unit JUNIOR 4-H’ers (9-13 years) will be able to:

- Understand the basis of anatomy
- Understand the function of the skeletal systems
- Identify the bones in the skeletal system
- Define the function of the skeletal system
- Understand the digestive system
- Define the function of the digestive system
- Identify the digestive system
- Understand the reproductive system
- Define the reproductive system
- Identify the female reproductive system
- Define the different anatomy systems
- Understand the differences in body conditioning scores
- Identify the differences in body conditioning scores
- Assign body conditioning scores to cattle
Senior Objectives

Upon completion of the Beef Anatomy unit SENIOR 4-H’ers (14-18 years) will be able to:

- Understand the basis of anatomy
- Understand the function of the skeletal systems
- Identify the bones in the skeletal system
- Define the function of the skeletal system
- Understand the digestive system
- Define the function of the digestive system
- Identify the digestive system
- Understand the reproductive system
- Define the reproductive system

- Identify the female reproductive system
- Distinguish the different anatomy systems
- Define the different anatomy systems
- Understand the differences in body conditioning scores
- Identify the differences in body conditioning scores
- Assign body conditioning scores to cattle
- Discuss the differences in body conditioning scores
What is anatomy?

- Anatomy is the study of form and structure of animals
- Covers all the different animal systems
  - Skeletal System
  - Muscle System
  - Nervous System
  - Digestive System
  - Endocrine System
  - Respiratory System
  - Circulatory System
  - Reproductive system
Skeletal System

• Is the framework of the body
  • Provides structural support and protection for all organ systems
  • Allows the body to move

• Made of bones and connective tissues
  • Joints are where two or more bones meet
  • Ligament is a tough band of connective tissue connecting bones together
  • Tendons are a thick band of tissue that connects bones and muscle

• There are several different types of bones to make an animal's structure
  • Long Bones are support columns, assist the body in support, movement, and eating
  • Short bones are shaped like cubes and are found in the joint area, diffuse concussion and diminish friction
  • Flat bones protect vital organs, like the brain, heart and lungs
Skeletal System

Fun Fact!
Cows have 207 bones in their body.
Muscular System

- Allows the movement of limbs and body
  - Muscles are made up of tissue which is a collection of specialized cells
- There are two different classifications of muscles
  - Voluntary is the movement of muscle under the control of the animals
    - Ex: Muscles used for walking around
  - Involuntary is the movement of muscle not controlled by the animal
    - Ex: Heart
- There are also three different types of muscles
  - Smooth Muscles are found in the walls of internal organs and are considered involuntary
  - Cardiac Muscles are the muscles that make up the heart and are considered involuntary
  - Skeletal Muscles are attached to bones and help the animal move
Digestive System

• Breaks down various sources of nutrients into molecules that can be used by the cells of the body

• The digestive system consists of
  • Mouth, tongue, pharynx, esophagus, stomach, small intestine, large intestine, and anus

• Cows are ruminates; meaning they have four compartments within the stomach
  • The four compartments of the stomach are Reticulum, Rumen, Omasum, and Abomasum

Fun Fact!
Cows do not have front teeth on the top of their month. They only have teeth on their bottom jaw, and molars on both top and bottom. Therefore cows have a total of 32 teeth.
Grass/feed is chewed and broken down in the mouth and is formed into a bolus. The bolus then enters the esophagus and passes down into the rumen. The bolus then goes back up the esophagus where it is broken down into smaller pieces. The smaller pieces are then swallowed back and enters the reticulum followed by the omasum. In the omasum the pieces are broken down even further into molecules. The molecules will then enter the abomasum where the nutrients are absorbed and used throughout the body. The molecules that are left then exit the digestive system through the small and large intestines creating solid waste.
Circulatory System

• Is responsible for moving blood throughout the body
  • It also removes waste, carries the immune response to infections and regulates temperatures
• It consists of
  • The heart, veins, capillaries, arteries, lymph vessels, and lymph glands
Respiratory System

• Provides oxygen to the blood,
  • Also allows noise to be created by the voice box, and excretion of waste gases
• Consists of
  • Nostrils, Nasal cavity, pharynx, epiglottis, larynx, trachea, bronchi, bronchioles, alveoli, diaphragm and lungs
Endocrine System

• Is a network of glands that secrete hormones
  • Hormones provide chemical controls for various functions of the body
• Is made up of the
  • Hypothalamus gland - controls the pituitary gland, and synthesizes antidiuretic hormones
  • Pituitary gland - creates amino acids, and secretes growth hormones
  • Thyroid gland - creates amino acids, and stimulates growth and metabolism
  • Adrenal gland - creates amino acids, and secretes epinephrine and norepinephrine
Reproductive System

- Reproduction is the process of animals producing offspring
  - Parents are selected to achieve certain goals with production
    - Heavier muscled calves, higher milk production
- Sexual Reproduction is the union of sperm and egg
  - Sperm is the sex cell of male animals
  - Egg is the sex cell of female animals
- Fertilization is the process by which the union of sperm and egg occurs
- Gestation is the period when a female is pregnant
- Parturition is the process of giving birth
  - Lactation is the secretion of milk by the mammary glands of females
- Prepuberty is the stage of a young animal before it is capable of reproduction
- Puberty is the stage when an animal reaches a level of sexual development ready for reproduction

Fun Fact!
Cows are pregnant (gestation length) for 9 months or 283 days.
Reproductive System

Photo Credit: University of Missouri Extension
Nervous System

• Coordinates physical movement of the body
  • Responds to actions

• Composed of 2 Major parts
  • Central Nervous System
    • The brain and spinal cord
      • Is the body’s control center coordinating movement and activity throughout the body
  • Peripheral Nervous System
    • Nerves found all over the body
      • Is the messenger, carrying messages to the central nervous system
Body Conditioning Scores
Body Conditioning Scores (BCS)

• Body Conditioning scores are used to determine the overall health of the animal
  • It allows farmers/producers to decide which cow(s) are ready for breeding, if they are too fat/skinny
  • Also allows for farmers to evaluate their feeding and grazing programs
    • Example: If cows are skinny, they can increase the amount of feed given, or if cows are fat, they can decrease the amount of feed given
    • Farmers are also able to group cattle by BCS to ensure the cattle are fed accordingly by body condition
    • Having cow(s) that are too fat/skinny makes it harder to breed, and can lead to dystocia when the calf is born

• There are 9 different levels of scores
  • 1-3 is very poor and cow is too thin/skinny
  • 4-6 is average and cow is the correct weight
  • 7-9 is very high and cow is too fat/overweight

Dystocia means having a difficult birth.
Most farmers and producers prefer their cows to have a BCS of 5 to 6.

### Table 1. Body condition scoring system for beef cows.

<table>
<thead>
<tr>
<th>Score</th>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Severely emaciated</td>
<td>Individual spinous processes, shoulder, rib, and hip bones are obvious. No apparent fat cover. Shoulder, loin, and rear quarter muscle has marked atrophied appearance. Physically weak (Fig. 1).</td>
</tr>
<tr>
<td>2</td>
<td>Extremely thin</td>
<td>Same as 1 but not weakened (Fig. 2).</td>
</tr>
<tr>
<td>3</td>
<td>Very thin</td>
<td>Individual spinous processes, shoulder, rib, and hip bones are obvious. No apparent fat cover. Only slight muscle atrophy (Fig. 3).</td>
</tr>
<tr>
<td>4</td>
<td>Slightly thin</td>
<td>Individual spinous processes no longer apparent. Rear ribs, hip, and pin bones evident. Slight fat cover over shoulder and foreribbs only. No visible muscle atrophy (Fig. 4).</td>
</tr>
<tr>
<td>5</td>
<td>Moderate</td>
<td>Last two ribs noticeable. Small amount of fat over shoulder, foreribbs, and loin. Slight or no fat on brisket or over hip and pin bones (Fig. 5).</td>
</tr>
<tr>
<td>6</td>
<td>Slightly fleshy</td>
<td>Individual ribs are not evident. Moderate fat covering over shoulder, loin, and foreribbs. Some fat in brisket and over last ribs and hip bones (Fig. 6).</td>
</tr>
<tr>
<td>7</td>
<td>Fleshy</td>
<td>Very smooth profile due to fat deposits. Considerable fat covering over shoulder, rib, loin, and hip. Fat fills out brisket, flanks, and tailhead.</td>
</tr>
<tr>
<td>8</td>
<td>Obese</td>
<td>When viewed from behind, back and hips have square appearance, and tailhead is full due to excessive fat deposits. Flanks appear deep, and brisket is full and distended with fat.</td>
</tr>
</tbody>
</table>
Body Conditioning Scores

Photo Credit: Texas A&M University Extension
To determine a body conditioning score, farmers look at the fat/muscle coverage on the animals.

They focus on the ribs, hooks and pins, and spine to see how noticeable the bones are. The more bone you see, the lower the score. They also focus on fat coverage; you want some coverage along the shoulder, foreribs, and loin. Too much fat means the cow is overweight.
How would you score these cows?
How would you score these cows?

Cow A has a score of 3. She is very thin, her shoulder, rib, and hip bones are obvious, and has no fat cover.

Cow B has a score of 5. She is moderate, has some fat coverage over her hip and pin bones.

Cow C has a score of 4. She is slightly thin, her ribs, hip and pin bones show, but she has some fat coverage.
Review

• Anatomy is the study of form and structure of animals
• Skeletal System is the framework of the body
• Muscular System allows the movement of limbs and body
• Nervous System coordinates physical movement of the body
• Digestive System breaks down various sources of nutrients into molecules that can be used by the cells of the body
• Endocrine System is a network of glands that secrete hormones
• Respiratory System provides oxygen to the blood
• Circulatory System is responsible for moving blood throughout the body
• Reproductive system is the process of animals producing offspring
Review

• Body Conditioning Scores (BCS) are used to determine the health of a cow
• There are 9 different levels of scores
  • 1-3 is very poor and cow is too thin/skinny
  • 4-6 is average and cow is the correct weight
  • 7-9 is very high and cow is too fat/overweight
References

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Photo Sources


Questions

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