

Factors that Influence Weight

Livestock nutritionists are responsible for understanding how genetic and environmental factors can change an animal's weight.

Genetic Factors

Genetic factors are genes made from an animal's DNA that can influence an animal's weight. For example, an animal might have genes to be very muscular or have very little muscle.



Environmental Factors

An animal's genes are only part of what determines their weight. Without proper nutrition, any animal will never reach their full potential. The type of nutrition that an animal receives is an environmental factor. An environmental factor influences the way that an animal's genes show up in their development. For example, a cow might have the genes to be big and strong, but if they don't have access to healthy food, it will never reach the full potential of their genes!



Rations and Digestibility Trials

A livestock nutritionist's first job is to create a ration. A ration is a carefully selected mixture of ingredients. For example, one ration might contain corn, cottonseed hulls, and oats. Once the ration has been created, the livestock nutritionist must figure out if the animal is fully digesting the feed.

When food is digested, it is broken down into simple sugars and absorbed into the bloodstream. Then, the sugars are broken down, and the energy from inside the sugar is used to build muscle and fat.

If the feed is very digestible, it means that almost all of the nutrients are being broken down into simple sugars and used for energy inside the animal. If a feed is not digestible, it means that the animal is eating the food and the nutrients are not being broken down as well.

A feed that is not very digestible wastes feed ingredients and money because farmers are spending money on a feed that is not useful to their animals. To determine the digestibility of a feed, livestock nutritionists often perform digestibility trials. Here's how a digestibility trial works:

- Step One: Scales are placed under the feed bunk where the animals feed is placed for them to eat.



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- Step Two: Two sensors are used to determine how much feed an animal eats. One sensor is placed around the animal's neck, and the other is placed on the feed bunk.



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- Step Three: When an animal's sensor crosses the threshold of the feed bunk sensor, the scales are activated. The scale takes the beginning weight of the feed minus the weight of the feed after the animal has finished eating. This number is the amount of food the animal ate. (Beginning weight of feed - Ending weight of feed = amount of feed the animal consumed.)
- Step Four: Special devices are used to capture the animal's poop.
- Step Five: The animal's poop is tested with special equipment in a laboratory to see how much of the nutrients were broken down into simple sugars.



Creating a Device to Test Digestibility

Step 1: Create a Ration

This ration will be fed to the animals in a feed bunk with scales under it.

Pick a Protein

This will be the base of your feed. Protein is important because it helps the animals build muscle. Choose one of the following ingredients by circling your choice.

Corn



Beet Pulp



Soybean Meal



Pick a Fat

This is added to the feed to increase the energy content. This helps animals gain weight and create fat deposits. This makes the meat taste good! Choose one of the following ingredients by circling your choice.

Oats



Cottonseed Meal



Flax Seed Hulls



Pick a Supplement

This will be added the feed to make it taste good for the cows! This is called "palatability." Just like you, animals like to eat feeds with high palatability, or foods that taste good! Choose one of the following ingredients by circling your choice.

Molasses



Cranberry Pulp Meal



Alfalfa Cube



Step 2: Create a Sensor

This sensor will be placed near the head of the animal. It will be able to detect how much food the animal eats. Your device must meet the following requirements:

- Must have a way to attach to the animal's head.
- Must have an antenna to send data about how much the animal eats to the farmer's tablet or computer.
- Must be smaller than a dollar bill so it isn't too heavy for the animal to wear.

Step 3: Create a Device

This device must attach to the animal and capture all of the animal's poop. Then, the poop will be collected and tested to see if the nutrients in the food were fully digested. Your device must meet the following requirements:

- Must have a way to attach to the animal.
- Must capture all of the animal's poop.
- Must have a flap for easy removal of the poop into a bucket or other collection device.