THE UNIVERSITY OF ARIZONA
Cooperative Extension

az2069 October 2023

Project Essential Fact Sheets: Growing a Show Beef Project

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Overview

Raising a beef project is a great way for youth to learn about livestock and raise a quality market product through the 4-H program. In this document we have listed some strategies and resources that will help ensure you have a successful project experience for your local fair and auction. Some essential considerations include ration composition, ration schedule, and understanding/planning around your beef's ability to gain weight. Be sure to work with your county Extension staff and 4-H Leaders to find additional resources and have the best chance for success!

Feeding Rations

Ration composition and schedule (what is fed to the animal and when) are important in keeping your beef healthy and gaining weight to meet show and market standards. Many 4-H members purchase feed that is a commercially mixed complete ration - these can work very well when used with proper timing and instruction. In general, beef rations need to include 5 basic nutrients: water, carbohydrates, protein, minerals, and vitamins.

- Water is extremely important and is over 70% of your animal's body. Your beef project requires 10-15 gallons of water per day to help with digestion, nutrient transport, waste removal, and temperature regulation. Fresh, clean water should be provided at all times.
- Carbohydrates will make up 80% of your beef animal's diet and are an important source of energy for your animal.
- Protein is required for animal growth and muscle development. Your beef's feed should consist of 12-15% crude protein.
- Minerals are important elements for growing your beef cattle. Minerals that need to be included in feed include calcium, phosphorus, and sodium chloride (salt).
- Vitamins play a key role in the health of your animal. There are two classes of vitamins, fat-soluble and water-soluble. Water-soluble vitamins include C and B-complex and are not essential for your animal. Fat-soluble vitamins are needed and include vitamins A, D, E, and K.

Weighing a ration is one of the most important aspects of feeding animals, especially if you are mixing your own feed. The total amount of feed fed per day, both roughages and concentrates, should be divided into at least two servings. A heifer grows at a moderate rate and needs about 1.5% of their body weight in concentrates per day. Steers grow more rapidly and can safely consume up to 2-2.5% of their weight in concentrates. To increase palatability or reduce dust in your rations you can add up to ½ cup per day of molasses.

The breed, sex, and frame size of your calf are factors that affect growth rate. Exotic-type calves - for example

those with influences of Maine, Charolais, Limousin, and Simmental - will require more dense foods that include high volume of lower protein source, higher fat content, and good source of fiber. British breeds, for example Angus and Hereford, generally have higher conversion rates and can put condition cover on relatively quickly. These types of cattle will need more of a filler combined with a higher protein source to allow them to deposit cover as well as grow vertically.

There are two major categories of feed: concentrates and roughages. Concentrates, such as cereal grains, are high energy feeds and contain less than 18% crude fiber, and roughages, such as forages, are lower energy feeds that contain over 18% crude fiber. Both are essential for your beef's ration, when feeding remember that younger, growing animals need more protein.

As ruminants cattle need roughage in their diet to keep the rumen functioning as it should. Feed good quality grass or alfalfa hay. Alfalfa is found to be very enjoyable for cattle, it has a laxative effect that can cause bloat, so do not overfeed.

Most commercial and show feed manufacturers have three major basic feed mixes: starter, grower, and finisher rations.

Starter Ration

Most 4-H members generally do not require starter rations as their beef have already weaned and transitioned to solid rations. If you do require a starter ration, such as with a bottle calf, be sure to transition very gradually during the weaning process to avoid bloat. Gradually add small amounts of the starter ration incrementally over 3-5 days and carefully watch for signs of bloating. There are quality commercial feeds that are specifically formulated for early nutritional needs, so work with your Extension staff, 4-H leader, and feed store to make sure that you get a quality feed and safely transition the calf from milk and milk replacers.

Examples of Feed	Nutritional Benefits
Alfalfa	Most common feed contains 50-60% TDN and 15-22% CP.
Soybeans	Can be fed in different forms such as hulls, meal, and seeds. Soybean meal is a good protein sources with 40-47% CP and 80%TDN.
Pasture Grass	Pastures vary greatly in quality. It is best to visit with your local Extension Agent to identify the species and quality of grass.
Orchard Grass	Contains an average of 65% TDN and 18.4% CP.
Timothy Grass	Great option for animals with bloat issues. Consists of 55-65% TDN and 8-10% CP.
Barley	Contains 75-85% TDN and 13-14% CP.
Corn	The most common feed grain in the US and usually contains over 85% of TDN but only 2% CP.
Oats	Known as one of the safest grains to feed, as they have the least tendency to cause digestive problems. High in fiber with 10-12% but are the lowest in TDN at about 70-75%. Generally used to maintain animals or act as a filler in a ration.
Wheat	Wheat must be fed gradually ideally blended with other feeds, and must be fed in a processed state. High in protein with about 12-14% CP.

Growing and Finishing Rations

Total Digestible Nutrients (TDN) and Crude Protein (CP) are two percentages growers need to keep a close eye on and adjust when transitioning from the growing ration to the finishing ration. For most 4-H members, commercially produced feeds fulfill the majority of needs a beef project has. There are many quality pre-mixed rations, so work with your Extension staff, 4-H leader, and feed store to get the appropriate product.

Growing Rations:

- At this stage the goal is to grow - not fatten. Growing feed tends to be lower in high energy (TDN) and higher in CP allowing for cattle to grow muscle and mass.
- Gains in this stage range from 1.5-2.5 pounds per day.
- Growing steers: Limit concentrated feeds to 1-1.5 lbs per 100 pounds of body weight. Feed free choice roughage.
- Growing heifers: Limited concentrated feeds to .5-1 lb per 100 pounds of body weight. Feed free choice roughage.

Finishing Ration:

- Finish rations are higher in energy and designed to promote fat deposition and rapid gains. Finishing feed tends to be lower in CP and higher in TDN.
- Finishing rations are lower in roughages, 20% or less, and mostly made of concentrates.
- Full feed concentrates at 2-2.5 pounds per 100 pounds of body weight. Limit dry roughage feed to 3-5 pounds per day.

When transitioning from a growing to a finishing ration, be sure to slowly reduce the amount of roughage as you slowly increase the amount of concentrates. This change in diet should take 1-2 weeks to prevent bloat. It takes about 140 days to finish a medium frame steer.

Weight Gain Calculations:

Managing feed composition and schedule is an essential part of growing a quality beef project in time for the show and sale. Many important factors affect an animal's potential for growth, and the timing of transition from growing to finishing rations. For a complete discussion of frame size and finishing weight calculations see Jim Sprinkles' UA publication Feeding Management for Show Steers.

As a general tool, there are several equations that are useful to determine your animal's Average Daily Gain (ADG) and the feed requirements to make weight for your show date. As a rule of thumb, beef usually convert about 7 lbs. of feed into 1 lb. of gain, but this will vary across individuals and types of cattle.

- To determine the optimal purchase weight for your steer or heifer you must determine the following factors:
  - **Desired weight** you would like to achieve at the time of your County Fair, this should be between 1,000-1,300 lbs. Make sure you read your County 4-H Premium Book for your fair's minimum and maximum weight requirements.
  - Number of **days until your county fair.**
  - **Average Daily Gain** is the rate of eight gained by your animal per day. Usually for Market Beef, this is between 2.0-2.75 lbs. a day.
  - Use these simple equations below to discover how much your beef should weigh at purchase:
    (Days until fair) x (Average Daily Gain) = Pounds of gain before fair
    (Desired weight) - (Pounds of gain before fair) = Ideal purchasing weight
  - For most 4-H projects, beef purchase weights should be between 500 to 800 lbs. Generally, you will need at least 6-9 months before the county fair.

Example Rations:

Growing Ration per day for 600 pound steer:

- Dry matter: 2.5% of body weight
  - 600 pounds x .025 = 15 pounds of dry matter per day
- Concentrates: 1-1.5 pounds per 100 pounds of body weight
  - 600 pounds/ 100 = 6 x 1 pound= 6 pounds of concentrates per day
- Roughages: Free feed
  - Animals should be eating approximately 9 to 12 pounds per day

Finishing Rations per day for a 1100 pound steer:

- Dry matter: 2-2.5% of body weight
  - 1100 pounds x .025 = 27.5 pounds of dry matter per day
- Concentrates: 1.5- 2 pound per 100 pounds of body weight
  - 1100 pounds/ 100 = 11 x 2 pounds = 22 pounds of concentrates per day
- Roughages: Limited
  - Approximately 4 to 8 pounds per day

Health Issues

Finally, the health of cattle is directly impacted by the care it receives. Provide a clean, dry, safe environment with access to clean water. Feed on a regular schedule and do not suddenly change feeds. Make all diet adjustments gradually to prevent bloat. Control pests such as flies and attend to al wounds quickly. With nearly all health issues, biosecurity plays a major part in keeping animals healthy and preventing the spread of health issues. Plan out an appropriate biosecurity plan with 4-H leaders, and work with a vet to make sure that your beef project is receiving proper preventative and interventional care. Spend some time reading about common health issues in beef cattle so you can recognize and address any issues early.

Useful references:

- Find your county/Tribal Nation Extension program and staff - https://extension.arizona.edu/locations
- Youth for the Quality Care of Animals Training - https://yqcaprogram.org/
- Feeding management for show steers - https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1054-2015.pdf
- Ration formulation calculator - https://extension.psu.edu/ration-formulation-for-growing-cattle
- Common diseases - https://extension.psu.edu/common-diseases-of-grazing-beef-cattle
- USDA cattle disease resources: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/cattle-disease-information

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extension.arizona.edu/pubs/az2069-2023.pdf

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