A very important concept for producers to keep in mind when planning a nutrition program for beef cattle is the biological priority for nutrients. Beef cows may produce at significantly lower rates if all other requirements, such as maintenance, growth and milk production, are not met first.

### Biological Priority for Nutrients by Beef Cows

<table>
<thead>
<tr>
<th>Priority</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintenance</td>
</tr>
<tr>
<td>2</td>
<td>Growth</td>
</tr>
<tr>
<td>3</td>
<td>Milk production</td>
</tr>
<tr>
<td>4</td>
<td>Reproduction</td>
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</tbody>
</table>


A number of conditions require adjustments to basic feed requirements for beef cattle. Body condition, stages of growth and environmental conditions, such as hot or cold temperatures, can all affect nutrient and energy needs.

**DO YOU KNOW**

If you think you need to find out more, check out the information in Animal Health & Welfare on the Virtual Apprentice 2020: Animal Husbandry & Welfare website at [www.etsanimals.ca/va2020/farmQ2.html](http://www.etsanimals.ca/va2020/farmQ2.html).

**LINK**

Watch the About feed requirements video on the Virtual Apprentice 2040 website at [www.etsanimals.ca/va2040/production.html](http://www.etsanimals.ca/va2040/production.html) for more information.

Body condition scoring is a skill that can help you determine the nutrition levels of a feeding program for beef cattle. Research at different universities has shown that visual evaluation of body condition can be an accurate assessment of body fat reserves.

Training and practice can help beef cattle owners and producers accurately evaluate body condition and make it easier to sort cattle into groups that are fed at appropriate levels. This can help save money and keep cattle in proper condition for maintenance, production and reproduction.
KNOW HOW COLD AND HOT WEATHER AFFECTS FEED REQUIREMENTS

Energy content of feeds and the amount provided to animals becomes more critical under cold conditions. Severe winter weather can cause cows and heifers to lose body weight more quickly if they are underfed than mild weather will. Feed adjustments may need to be made to prevent losses in weight and body condition.

As a general rule, feed should be increased by about one percent for each degree below the lower critical temperature. The estimated lower critical temperature for beef cattle changes with cattle hair coat.

Beef cattle can be affected by heat stress that may result from heat waves — short term hot weather patterns. Heat waves that occur late in the summer season cause fewer animal deaths because animals become acclimatized to high temperatures. Therefore, heat waves early in the summer season can have a stronger effect on animal health. A supply of cool, good quality water is essential to minimize heat stress.

KNOW HOW FEED SHOULD BE ADJUSTED FOR COWS AND CALVES

The health of calves depends significantly on the nutrition their mothers get during the last 90 to 100 days before calving. Inadequate energy levels during this critical period can decrease the strength of both the cows and the unborn calves.

Inadequate nutrition can affect the ability of calves to nurse. It also affects the natural protection provided by colostrum, or the first milk.

Energy intake and body condition at time of calving can also have considerable influence on how well cows cycle and rebreed following calving; thus paying attention to energy content of feeds pays dividends in several different ways.

Heifers, female cows that have not given birth to a calf, reach puberty by about 15 months of age. They require nutrients — mainly protein — to reach 60 to 65 percent of their expected mature weight by this time. Heifers should gain about 80 percent of their mature weight when they calve for the first time.

DO YOU KNOW enough about basic nutritional needs of beef cattle? If you think you need to know more about dry matter intake and other nutritional terms, go to Beef cattle requirements for feed & water in this inquiry topic.

Growing heifers need a higher concentration of protein because they have a lower dry matter intake. They need good quality forage or to be fed supplemental protein to grow prior to their first breeding season.

Gestation, or the period of pregnancy, does not affect a cow’s protein requirements until about the seventh month of pregnancy. In the last third of the pregnancy, protein intake should be increased as about two-thirds of fetal growth occurs during this time. Increased protein intake ensures that the cow is in good condition when calving. Losses of body condition can occur in late pregnancy if increased daily protein or energy needs are not met.

Milk production, or lactation, increases nutrient needs for beef cows. Milk contains a high concentration of protein. Therefore, lactating cows, particularly during early lactation, require nearly twice the daily protein of dry cows. Inadequate nutrition can result in a longer period of time before rebreeding can occur.
KNOW ABOUT FEED CHOICES

There are a number of choices that help cattle owners and producers manage feed sources and rations.

- Gates can allow cattle to be split into two main feeding groups — those that need adjusted feed rations and those that need standard rations — and be fed appropriately.
- The efficiency of feeders should be monitored. Do they waste a lot of hay? Can they be modified? Is there enough feeder space? When on a restricted diet, it’s important that cattle all can feed at once.
- Consider other forage feed choices. Cereal straw can be fed as part of a ration. Limit to between 5 and 6.5 kg to avoid impaction of the rumen. Make sure protein levels are adequate and lots of water is available.
- Consider if there is a way to use corn stalks. As grazing? Hay? Or bedding?
- Consider soy and canola straw. Cattle probably won’t eat these unless they can be chopped and mixed with other forage, but use them for bedding, and they will pick at them.
- Use bedding. Lack of bedding can increase energy needs by 10 to 15 percent.
- Corn and other grains can be used to increase energy intake in very high forage diets. However, the starch contained in grains can have a negative impact on forage intake and the ability to adequately digest fibre.
- If the hay has tough fibres and is low in protein, a protein supplement can help to drive the rumen and increase digestibility of the forage. However, a high grain-based supplement in excess of 1.8 kilograms can reduce forage consumption, as well as decrease the amount of energy cattle get from the forage.

- Fibre-based supplements or feed ingredients that are high in digestible fibre can be used as an alternative to grain. These supplements or ingredients can provide an energy source for cattle that require additional condition. They substitute for forage, but do not have the negative effect on fibre digestibility that grains do. They can be fed when homegrown forages and pasture resources are limited.

Beef cattle should be fed to their requirements.
KNOW ABOUT NUTRIENT DEFICIENCIES

Energy is the most important nutritional factor for beef cattle, and can be the nutritional factor most commonly lacking due to shortage of forage. Low energy intakes can result in deficiencies that include:

- Decreased maturation rates and growth
- Loss of body weight
- Lowered resistance to disease and parasites
- Poor conception rates.

Protein can be lacking in summer and fall diets when green forage is not always available. Low protein intake can result in deficiencies that include:

- Reduced appetites
- Reduced growth rate in fetuses and calves
- Loss of weight
- Inadequate intake of other nutrients
- Poor conception rates
- Reduced milk production.

Salt supplements are an important part of a nutritionally balanced diet for cows. Ruminants have a strong appetite for sodium and will return to the exact location of a salt source when they are deficient. Cattle require .25 percent salt in their dry matter intake. Young cattle can consume about 45 grams of salt per day and mature cattle can consume between 45 and 136 grams.

This strong appetite can be used as a feeding strategy for nutrients that cattle do not find appealing or to limit feed.

A number of different minerals are required for growth, bone formation, reproduction and many other body functions. Those that are required in fairly large amounts are called macro-minerals. They include sodium chloride (salt), calcium, phosphorous, magnesium and potassium.

Those that are required in very small amounts are called micro, or trace, minerals and include iodine, copper, zinc, sulphur and selenium.

Mineral content is affected by the type and quality of the feedstuff. The addition of supplementary minerals to the ration can sometimes be necessary to make sure that adequate amounts of these minerals are provided. The type of supplementary minerals is determined by the feeds in the ration and the animal’s requirements.

Necessary vitamins for good beef cattle nutrition include vitamins A, D and E. Fresh forage is a good source of these vitamins. The vitamin content of well-preserved hay is initially high, but declines over time. Silages usually contain low amounts, since the fermentation process destroys most of the vitamins. Grains usually contain relatively low amounts of these vitamins.
Insufficient vitamins can result in deficiencies that include the following:

- Vitamin A is essential for normal growth, reproduction and maintenance. Insufficient vitamin A can be associated with lowered fertility in both bulls and cows.

- Vitamin D is required for proper development of bone. Vitamin D deficiency in calves results in bowing of the leg bones, called rickets. In older animals, bones become weak and easily fractured.

- Vitamin E, along with selenium, is required for proper development of muscle tissue. Lack of vitamin E and/or selenium causes nutritional muscular dystrophy, commonly called white muscle disease. It is most common in young calves.


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<table>
<thead>
<tr>
<th>Mineral</th>
<th>Deficiency symptoms</th>
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<tbody>
<tr>
<td>Calcium</td>
<td>• Poor growth</td>
</tr>
<tr>
<td></td>
<td>• Bowed leg bones</td>
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<tr>
<td></td>
<td>• Brittle bones</td>
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<tr>
<td>Phosphorous</td>
<td>• Poor growth</td>
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<tr>
<td></td>
<td>• Craving for wood, hair, soil</td>
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<tr>
<td></td>
<td>• Poor conception rates</td>
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<tr>
<td>Magnesium</td>
<td>• Muscle tremors</td>
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<tr>
<td></td>
<td>• Staggering, convulsions, grass tetany</td>
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<tr>
<td>Sodium chloride (salt)</td>
<td>• Poor growth</td>
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<tr>
<td></td>
<td>• Chewing or licking various objects</td>
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<td></td>
<td>• Rough haircoat</td>
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<td>• Lack of coordination</td>
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<td></td>
<td>• Weakness</td>
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<tr>
<td>Selenium</td>
<td>• Weakness</td>
</tr>
<tr>
<td></td>
<td>• Inability to stand</td>
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</tbody>
</table>

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**DO YOU KNOW**

how nutritional deficiencies can lead to nutritional disorders and disease? If you think you need to know more, go to How to deal with pests, ailments & disease in beef cattle in the inquiry topic, Know safe practices for livestock health at www.etsanimals.ca/va2040/production.html.