



Winter Feeding Programs For Beef Cattle and Calves

LPM-00741

Before making management and feeding decisions about beef cattle and calves, consider the following questions: What performance do you expect from the calves you are wintering and what level of weight gain should you aim for? Which feeding program is most profitable? How will interest rates and overhead affect your costs? Do your cows need to gain weight during the winter or are they in “fat” condition coming off pasture? How much feed do you have on the farm? What is its quality?

Plan your winter feeding program well in advance and make use of the feed analysis and ration formulation services available to you.

Winter Feeding Programs for Growing Calves

In the past, producers have used feeding programs designed to allow calves to gain weight at a rate of 1.10 to 1.75 pounds per day. This sort of program is still appropriate for calves going back on grass the next summer, or for calves that must be grown out before going on full feed in order to reach acceptable slaughter weights.

Many producers now aim for a daily gain of 2.0 to 2.2 pounds. Large growthy calves, especially cross-bred calves from European breeds, have the ability to gain weight rapidly, obtain acceptable slaughter weights and still grade Choice. If you are feeding bull calves for slaughter, it is generally recommended to aim for high rates of gain.

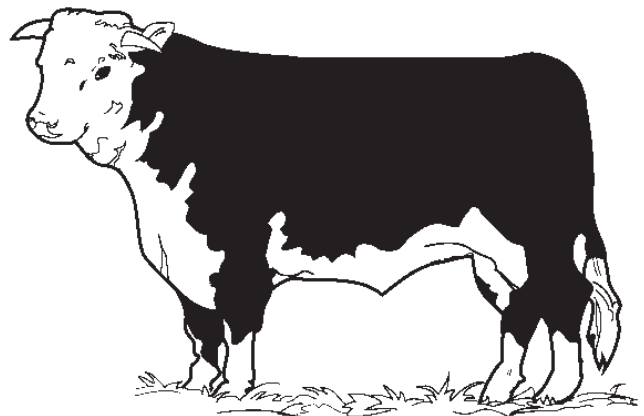
A feeding program that produces rapid gains should only be used when the calves are going to remain in the feedlot until they go to slaughter. If the calves are

to be marketed as feeder cattle, a program that will produce moderate gains is recommended. Most buyers of feeder calves discount fleshy cattle.

Compensatory gains on grass are higher for calves fed to gain 1.0 pound per day during the winter than for calves whose winter gains are much higher. Calves should be fed to gain only a modest amount of weight in order to take advantage of compensatory gain when going on grass in the spring.

Check the Costs Before Feeding

When deciding on your feeding program, bear in mind that feed costs per pound of gain generally decrease as the rate of gain increases. Check this by applying your feed costs to some of the rations suggested in the examples that follow. Also check the costs of alternative feedstuffs when you have a choice before purchasing. What some people claim or assume to be the least expensive may not be so when you actually calculate it for yourself.



If you are operating on borrowed money, consider the cost of interest. Overhead costs such as depreciation on equipment and facilities, and electricity and water charges probably amount to at least 15 to 20 cents per head per day as well. These costs are constant whether the calves gain 0, 1.0 or 2.0 pounds per day and must be taken into account.

The probable selling price of your calves should also be considered in setting up your feeding program. If your feeding needs to be modified to fit in with a change in expected selling date, the earlier you begin, the better you can plan your strategy.

What to Feed and How Much

Some grain must be included in most rations for wintering calves. A protein supplement may be necessary if you are feeding poor to medium quality forage. Use the best quality forage available for calves; cows can maintain themselves on poor to medium quality roughage.

Vitamin A should be included in the calves' grain mix or injected every two or three months. Calves should receive 20,000 to 30,000 IU of vitamin A per day. The lower amount is recommended for light calves and for modest weight gains. Use the higher level when rapid weight gains are expected, especially for heavy calves. Provided that the total amount of vitamin A meets the daily requirements, it can be fed daily, weekly or monthly, or injected once every two or three months. If a vitamin supplement contains 2,200,000 IU of vitamin A per pound then 1 or 1.5 pounds of vitamin A supplement per day should feed 100 calves.

Most calf rations require mineral supplementation. Whenever possible, the minerals should be mixed in the grain portion of the ration. Minerals should also be offered free-choice. If you are feeding a considerable amount of legume forage, use a mineral supplement containing equal parts of calcium and phosphorus. A ration based on a grass hay, greenfeed or cereal silage should be supplemented with a mineral containing two parts of calcium and one part of phosphorus. When a ration contains two-thirds or more of grain it should contain 1 percent ground limestone. Trace mineralized (TM) salt should be available free-choice, or be added to the grain mix. Be sure the salt does not contain more than 0.02 percent iodine. Supplemental selenium should be included in the ration at a rate not to exceed 0.3 ppm whenever Alaska feeds are fed.



These young calves wintered well on high quality grass hay plus vitamin and mineral supplementation. Photo by Don Quarberg, CES

Sample Rations for Calves Gaining 1.5 Pounds per Day

The following sample rations have been calculated on the basis of "average" feeds that are free of molds, dust and foreign materials and have received no rain damage. The rations formulated below provide the minimum nutrient requirements to take steer calves from 440 pounds to 660 pounds at a rate of 1.5 pounds per day. It is assumed that no growth implants or feed additives are being used. TM salt and vitamin A must be provided. The grain should also be rolled or coarsely ground.

Ration No. 1

- 10.6 pounds good quality grass hay
- 2.0 pounds barley grain
- 3.5 pounds of 32 percent protein supplement

Ration No. 2

- 11 pounds alfalfa-brome hay (50:50)
- 4.0 pounds barley grain

Ration No. 3

- 11 pounds oats greenfeed
- 2.8 pounds barley grain
- 1.32 pounds 32 percent protein supplement

Ration No. 4

- 26.4 pounds barley silage (60 percent moisture)
- 2.8 pounds barley grain
- 0.9 pounds 32 percent protein supplement



Large round bales are efficient and easy to handle with the right equipment. They must be fed from feeders to avoid excessive waste. Photos by Ken Krieg, CES

A one to one (1:1) calcium phosphorus mineral supplement may also be provided free-choice, although both calcium and phosphorus requirements are being met in these rations.

Sample Rations For Calves Gaining 2.0 Pounds per Day

The following sample rations have been calculated on the basis of “average” feeds as above and the minimum nutrient requirements to take steer calves from 440 pounds to 770 pounds at a rate of 2.0 pounds per day. It is assumed that no growth implants or feed additives are used. TM salt and vitamin A must be provided as required.

Ration No. 1

- 9.0 pounds good quality grass hay
- 6.0 pounds barley grain
- 3.0 pounds of 32 percent protein supplement

Ration No. 2

- 10 pounds alfalfa-brome hay (50:50)
- 7.1 pounds barley grain

Ration No. 3

- 10 pounds oats greenfeed
- 6.4 pounds barley grain
- 0.7 pounds 32 percent protein supplement
- 1.0 ounce of ground limestone

Ration No. 4

- 22 pounds cereal silage (65 percent moisture)
- 6.6 pounds barley grain
- 0.44 pounds 32 percent protein supplement
- 1.0 ounce of ground limestone

These calculations have been made to supply the calves with the amount of feed they should be receiving at the midpoint of the feeding period. At the start of the feeding period they should be fed about 10 to 15 percent less, whereas at the end of the feeding period they should be consuming 10 to 15 percent more feed. In very cold weather the average daily gain of the calves will probably be somewhat less than the target gain unless more grain is supplied in the ration.

If the calves are implanted, average daily gains could be about 10 percent higher than the target gains. The protein and mineral requirements of these calves should be increased by about 10 percent relative to the energy content of the ration. This means calves being fed ration No. 3 or 4 for either of the target gains should receive an additional .44 pounds of 32 percent protein supplement.

Remember that “average” rations using “average” feeds may not be optimal for your situation. **Ideally, rations should be designed for the actual feeds and management system involved.**

Here are some additional points to remember when formulating rations:

- The quality of roughage affects the requirement for supplemental energy and protein. For example, if the hay or silage is moldy, slightly overheated or rained upon before baling, energy and protein may need to be supplemented. A chemical analysis may not show a change in crude protein content if the hay is moldy, overheated or rain damaged.
- Greenfeed and cereal silage are normally relatively low in protein. Most growing rations based on greenfeed or cereal silage require supplemental protein.

Some other points to remember are:

- High quality legume forages, if consumed at adequate levels, can supply adequate energy and protein in a growing ration to achieve gains of about 1.0 pounds per day without supplemental grain.
- Grass hay is usually relatively low in energy and protein content. As a result it is usually necessary to feed grain and a protein supplement with grass hay.
- Grains that are high in protein will decrease the need for a protein supplement.
- When protein is the most limiting nutrient, a protein supplement is usually a more economical source of protein than is grain.

Winter Feeding Programs For Cows

Feeding Low Quality Feeds

The body condition of cows entering the winter season has a major effect on the amount and quality of feed they will need. Cows in thin condition in the fall must gain weight throughout the winter. As a result, they must be fed good quality forage or an average quality forage with some grain. Cows that are in good condition in early winter need only enough feed to maintain their weight until calving. In this case, poor quality hay or good straw can be the major component of the feeding program. If cows are in good condition in early winter, you can feed a good quality straw up to as much as 75 percent of the cows' diet with the exception of the six week period immediately prior to calving, when more energy intake will be required.

Straw can be fed in conjunction with medium to good quality hay, grain, protein supplement or combinations of these materials. Straw is only slightly lower in energy than average quality hay, but it is usually low in protein, minerals and vitamins. As a result, additional quantities of these must be given. In most cases grain

or high quality hay will supply the additional energy and protein needed.

When feeding low quality feeds watch carefully for sudden drops in temperature. When outside temperatures drop quickly the cow will attempt to consume more feed. If only poor quality feed is available she will attempt to eat more and will become impacted. Straw and poor quality feed put through a hammer mill or tub grinder will only increase the potential for impaction when sudden weather changes occur. When outside temperatures suddenly drop down to -20°F, the grain portion should be increased by up to 30 to 40 percent. The protein supplement does not need to be increased since the cow requires more energy and not more protein for keeping warm in cold temperatures.

Ammoniation of straw with anhydrous ammonia can improve its energy and protein content for feeding cows. This process can be done in temperatures ranging from 68° to -6°F in about 25 to 40 days. The amount of ammonia required is about 3.5 percent by weight of the straw being ammoniated. If you are considering ammoniating your straw, the cost of anhydrous ammonia and 6 mil black polyethylene must be included in the price of the straw when comparing it with other feeds. Trace minerals as well as calcium and phosphorus and vitamins must be included in the ammoniated straw ration. More information on ammoniation of straw can be obtained from your local Extension office.

Divide the Herd Into Different Feed Groups

Whenever cows are fed on low quality diets, such as straw or poor quality hay, or the amount of feed offered is closely controlled, dividing the herd into separate feeding groups becomes important. In these situations feed testing and a proper application of the feed test results becomes increasingly important.

The cow herd may be divided into two or three different groups for winter feeding. The first group may be the young mature cows which are in good condition. These need the least amount of care to get them through the winter in good condition.

The second group may include heifers calving for the first or second time. These young growing animals very often cannot compete effectively for feed with the mature cows and if extra feed is given, the older cows get too much feed and become too fat. The heifers need either a better quality hay or more supplemental grain than mature cows to compensate for their own growth.

A third group may consist of thin or old cows. Like the heifers, these are cattle which may have trouble competing with the more aggressive mature cows in better condition. These cows will need additional feed to get through the winter. If cows cannot be divided into three groups, combine the heifers and the old, thin cows in one group. It might be wise to send old, thin cows to slaughter rather than trying to winter them.

Minerals and Salts

Most winter feeding programs for cows require supplemental minerals and salt. Trace mineralized salt (nonmedicated) should be available on a free-choice basis. In addition, rations based largely on grass or legume hay should be supplemented by having a mineral supplement containing equal parts of calcium and phosphorus available on a free-choice basis. Rations based on greenfeed, cereal silage, straw and grain should be supplemented, on a free-choice basis, with a mineral containing two parts of calcium and one part of phosphorus. The amount of mineral consumed should be 0.5 to 1 ounce per head per day. It may be necessary to mix salt with the minerals in order to encourage the cows to consume enough. In this case, remove the salt mixed in the ration and provide only the salt mixed with mineral.

After calving, the cow's requirement for supplemental minerals increases by 2 to 5 ounces per cow per day depending on the amount of milk the cow is producing and the type of feed being used. After calving, a mineral supplement containing equal parts of calcium and phosphorus is normally the most suitable. If cows are being fed grain at this time, the mineral should be mixed with the grain because cows usually will not consume a sufficiently high amount of mineral free-choice. Remember, cows eat what they like, not what they require.

Vitamins

Beef cows require 40,000 IU of vitamin A daily before calving. After calving and before they have access to green grass, they need 60,000 to 70,000 IU of vitamin A daily. The higher amount is needed by superior milking cows. Vitamin A is stored in the liver and utilized when needed. It can be fed daily at two- or three-week intervals or at one- or two-month intervals, or a sufficient supply can be injected every two or three months. The best method is feeding vitamin A once weekly to ensure all cows get it at least two to three times monthly. If the cow is given vitamin A once a month, she should receive a 30-day supply at

that time, but if she is crowded out by the cows she will not receive her allotted quota.

Sample Rations

The sample rations below are designed to meet the needs of an 1,100-pound mature pregnant beef cow gaining 0.55 pounds per day under normal winter conditions in Alaska. In very cold weather, additional feed would be needed for the cow to continue to gain weight. This may mean extra grain if the hay is less than optimum quality.

The rations are based on the "average" nutrient content of Alaska feeds. These rations should contain adequate amounts of energy and protein, but will require mineral and vitamin supplementation. An analysis of your feeds is recommended so you can formulate the ration to meet cow requirements.

Ration No. 1

22 pounds grass hay

Ration No. 2

19.8 pounds alfalfa-brome hay (50:50)

Ration No. 3

14.3 pounds good quality barley or oat straw
7.9 pounds good quality alfalfa

Ration No. 4

16.5 pounds good quality barley or oat straw
3.3 pounds oats or barley grain
1.32 pounds 32 percent protein supplement

Plastic bags work well for storage of silage and high moisture grain in Alaska. Some freezing occurs at extremely low temperatures but does not prohibit removal of the feed.
Photo by Don Quarberg, CES



Ration No. 5

- 8.8 pounds grass hay
- 8.8 pounds good quality barley or oat straw
- 3.3 pounds oats or barley grain

Ration No. 6

- 19.1 pounds good quality greenfeed

Ration No. 7

- 42 pounds barley silage (60 percent moisture)

Be sure a mineral containing two parts calcium to one part phosphorus is provided free-choice with all the above rations.

These rations do not make allowance for wastage by cows. The amount of feed offered your cows should be increased to make up for the feed they waste.

During the last six weeks before calving, the amounts fed should be increased by about 15 percent. After calving, average milk producing cows should receive about 35 percent more feed than is shown above. Cows producing around 22 pounds of milk should receive 50 percent more feed. This may be accomplished by use of additional grain in the ration. After calving, reduce or eliminate the use of straw for feed. For every 10°F below -20°F, increase the grain by about 2.2 pounds over and above the levels cows normally receive.

Managing the Winter Feeding Program

Feed analysis and ration formulation techniques are useful tools for the manager; however, changes in weather, feed quality and appetite often occur and the manager must be able to observe and respond to these changes. Condition scoring the brood cows and periodic weighing of feeder cattle will help the manager determine if cattle are performing as expected on the feed program.

Ration Component	Possible Substitute
10 pounds barley grain	11 pounds oats grain
11 pounds alfalfa hay	6.6 pounds barley grain plus 3 pounds of a 32 percent protein supplement
11 pounds alfalfa hay	8.8 pounds grass hay plus 2.9 pounds of a 32 percent protein supplement
11 pounds grass hay	6.6 pounds barley grain
2.2 pounds of a protein or supplement	4.4 pounds excellent quality alfalfa 4.4 pounds dehydrated alfalfa

For more information, contact your local Cooperative Extension Service office or Milan Shipka, Extension Livestock Specialist, at 907-474-7429 or mkshipka@alaska.edu. This publication originally written by D. F. Engstrom, R. Westra and R. D. Weisenberger, Ruminant Nutritionists, Alberta Agriculture. Adapted for Alaska by Ken Krieg, Extension Livestock Specialist, April 1988. Reviewed in June 2011 by Milan Shipka.

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