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### G4-1228 Wintering and Backgrounding Beef Calves

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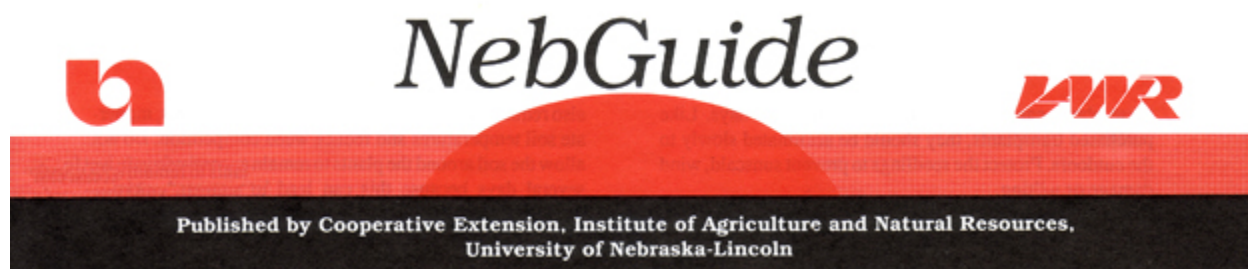
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## Wintering and Backgrounding Beef Calves

This NebGuide discusses feeding and management practices and possible feeding rations for summer grazing programs or for calves that are weaned and backgrounded before entering a feedlot for finishing.

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- [Reasons for Backgrounding Calves](#)
- [Management Considerations](#)
- [Cattle Types](#)
- [Nutrient Needs](#)
- [Ration Formulation](#)

### Reasons for Backgrounding Calves

Backgrounding programs allow calves to grow and develop bone and muscle without becoming fleshy. Reasons for backgrounding weaned calves include:

- Calves can be retained rather than sold at weaning when prices are typically low.
- Developing replacement heifers.
- Allows producers to use inexpensive home-grown feeds, crop residues, and/or pasture to put weight on calves economically.
- Can add weight on small to medium framed calves or lightweight calves born late in the calving season before selling.
- Put minimal weight on calves during the winter before they graze on pasture the following spring and summer.

### Management Considerations

A primary objective of backgrounding programs for weaned calves is to allow skeletal and muscle development without adding fat. There is usually a price discount for "fleshy" calves purchased to be finished in a feedlot. In addition, calves that are fleshy before going to pasture don't have the compensatory gain potential of calves that have been backgrounded using a program that allows for bone and muscle development with minimal weight gain.

The way calves are wintered and the rate of gain at which they are grown varies considerably depending on the management options and marketing objectives. Management practices most commonly used to grow calves can be categorized into three groups:

1. Calves to gain less than 1 pound daily. These calves typically are backgrounded with the goal that they will be grazed on pasture during the next spring and summer.
2. Calves to gain 1 to 2 pounds daily. A rate of gain that, in most cases, is used in replacement heifer development programs. It's a rate of gain that also allows some flexibility because lightweight calves may either go back to grass or to the feedlot. This program works well when cattle are in dry lot. At the end of the growing phase the heavier, faster growing cattle can be sorted and sold, or finished, while the lighter calves may bring a premium as grass cattle.
3. Calves to gain 2 to 2.25 pounds daily. These calves go directly to a feedlot for finishing.

Calves grown to gain less than 1 pound daily are generally fed roughages with a small amount of protein supplement, depending on the quality of the forage. They may graze cornstalks or milo stubble, or range meadows with very little protection except natural shelter. Producers managing cattle for low rates of gain should keep daily or winter feed costs low and maintain animal health rather than be concerned about cost of gain. Low feed costs and compensatory gains in the following period (usually summer grass) are necessary to offset high cost of gain when calves are grown at this slow rate. We recommend that these calves be fed an all-natural plant protein or bypass and natural protein combination supplement. Refer to NebGuide 84-693 *Protein Levels for Growing and Finishing Cattle* and 84-695 *New Protein Values for Ingredients Used in Growing Cattle Rations*.

Rates of gain below 1 pound seldom produce acceptable fertility in yearling heifers; therefore, producers should not intend to breed these heifers to calve as 2-year-olds. Usually, rates of gain this low do not allow heifers to reach their target weight, and therefore, puberty before the start of the breeding season.

Feeding programs where calves are wintered to gain between 1 and 2 pounds per day are common. These calves are fed 2 to 6 pounds of grain and/or commercial supplement per head per day and all the good quality hay they will eat. To cheapen up the ration, consider by-product feeds such as corn gluten feed, soyhulls, or beet pulp. Wintering cattle to gain at this rate provides the alternative of going either to grass or to a feedlot depending on their weight at the end of the backgrounding period. It may be advisable to sort the calves and finish the heavier, fleshy calves, and send the lightweight calves to grass. Heifers fed to gain this amount should reach puberty in time to conceive at 13 to 15 months of age.

**Table I. Daily cost of wintering 550 pound calves at different rates of gain.**

<b>Rate of Gain lb</b>	<b>Alfalfa Hay lb</b>	<b>Grain lb</b>	<b>Cost of Hay</b>	<b>Cost of Grain</b>	<b>Overhead Costs</b>	<b>Total Daily Cost</b>	<b>Cost/lb Gain</b>
0.8	15	0	\$.375	\$0.0	\$.25 <sup>1</sup>	\$.625	\$.78
1.5	11	4	.275	.20	.35 <sup>2</sup>	.825	.55
2.0	10	6	.25	.30	.35 <sup>2</sup>	.90	.45

<sup>1</sup> Assumes 15 cents yardage because these cattle are usually fed in large, open areas like a stock field, and 10 cents interest per head per day.

<sup>2</sup> Assumes 25 cents yardage and 10 cents interest per head per day.

Calves wintered to gain 2 pounds or more per day usually have the cheapest cost per pound of gain (*Table I*), but this may not be the most profitable system. The condition of cattle fed for faster rates of gain will vary depending on frame size, growth potential, and initial condition of the cattle. Generally, backgrounding cattle to gain over 2 pounds per day will likely cause them to begin putting on fat. However, this varies with frame size or expected slaughter weight of the calves. This method may cost more than just placing cattle directly on feed.

## Cattle Types

Backgrounding programs can be designed to last from 60 days to six months. The type of backgrounding program should fit the type of calves raised or purchased and also be based on sound economics which includes time of marketing. When designing backgrounding programs, keep in mind the type of end product that will be produced. Under current marketing practices, finished calves that have carcasses weighing less than 550 pounds, over 900 pounds, or are Yield Grade 4 or greater, usually receive substantial discounts.

*Table II* illustrates how frame size influences final finished weight. If you assume that the dressing percent of finished calves is 63 percent, a calf that is marketed out of the feedlot at 1,430 pounds has a 900 pound carcass ( $1,430 \times .63 = 900$  pounds). Large frame calves that are weaned on October 15th weighing 625 pounds do not likely fit into a program that is designed to background them over the winter for grazing on grass the following summer, even if they gain only 1 pound per day during the backgrounding period, because carcass weight at slaughter will be too large. For example, these calves are backgrounded for approximately 210 days from October 15 to May 15 when calves go to grass, then calves graze grass for five months (approximately 150 days) followed by a finishing phase of 120 days. If calves gained 1 pound per day for the first 210 days, 1.75 pounds per day on grass, and 3.5 pounds per day while in the feedlot they would weigh about 1,518 pounds going out of the feedlot [ $625 \text{ lb.} + (210 \text{ days} \times 1.0 \text{ lb/day}) + (150 \text{ days} \times 1.75 \text{ lb/day}) + (120 \text{ days} \times 3.5 \text{ lb/day}) = 1,518 \text{ pounds}$ ] with a 956 lb carcass. These types of calves should be finished after a short (30 to 60 days) backgrounding period.

In contrast, lightweight, small to moderate frame steers and heifers weaned in October fit a longer backgrounding program and will still produce an acceptable carcass weight after going through a feedlot finishing program. Putting a 425 pound, moderate frame calf through the same program as described previously, except that the moderate framed calves would only need 80 days in the feedlot to finish, would produce a final weight of 1,238 pounds. **Design the backgrounding program to fit the type of cattle.**

Researchers at the University of Nebraska are conducting research to evaluate the effect of winter backgrounding program and forage systems on feedlot performance, type of carcass produced, and overall cost of the system from weaning to slaughter. The systems being evaluated have a long backgrounding period followed by a grazing period before calves are finished in a feedlot. Medium framed British-breed heifers or steers are used and usually weigh less than 500 pounds when purchased. One key to the success of a grazing system is the ability for cattle to gain rapidly during times of summer forage grazing. Weight gains during grazing enable cattle to obtain most of their skeletal growth while on pastures, thus keeping finishing time and feeding costs at a minimum. Compensatory growth following a low input, low growth winter system allows good gains during spring and summer months. Cattle exhibiting compensatory growth and grazing cool-season grasses may have a higher protein requirement than those of the same weight with normal growth. Therefore, escape protein, which is undegradable in the rumen and passes to be digested in the small intestine, *might* be of most benefit in a supplement during the first two months of grazing.

In a system researched at Nebraska, calves grazed cornstalks during the winter and were fed ammoniated wheat straw to gain less than 1 pound per day. After the winter period, calves grazed different forage systems (*Table III*). This research indicates that it is possible to take lightweight calves in the fall, winter them at a slow rate of gain, graze them on summer pasture, and finish them at a respectable break-even and at a live weight similar to larger framed cattle that go through a short backgrounding period, then are finished. This means it is possible to have cattle that finish at similar weights that may be different in frame size and weight at weaning. This translates to a more uniform weight of cattle at slaughter. Refer to *MP61, 1994 Nebraska Beef Cattle Report*, for more information.

**Table II. Relationship of Frame Size to Live Weight and Carcass Weight at Choice Grade (30% Carcass Fat).**

Approximate weight at choice grade (pounds)				
Frame score	Steers Live	Steers Carcass <sup>a</sup>	Heifers Live	Heifers Carcass <sup>a</sup>
1	750	472	600	378
2	850	536	700	441
3	950	598	800	504
4	1050	662	900	567
5	1150	724	1000	630
6	1250	788	1100	693
7	1350	850	1200	756
8	1450	914	1300	819
9	1550	976	1400	882
<sup>a</sup> Assuming a dressing percent of 63% (hot carcass basis).				

**Table III. Economics of forage systems.**

Item	September	September	November	November	November
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	<i>removal, Brome</i>	<i>removal, Brome, warm season</i>	<i>removal, Brome</i>	<i>removal, Brome, warm season, turnips</i>	<i>removal, High- grain</i>
Steer cost, \$ <sup>a</sup>	519.47	500.27	503.92	510.24	606.62
Interest <sup>b</sup>	52.24	50.34	56.34	57.04	27.37
Health <sup>c</sup>	25.00	25.00	25.00	25.00	25.00
<b>Winter costs, \$</b>					
Feed <sup>d</sup>	43.72	43.72	43.72	43.72	—
Supplement <sup>e</sup>	35.67	35.67	35.67	35.67	—
<b>Summer &amp; fall costs, \$</b>					
Grazing <sup>f</sup>	46.55	46.55	66.85	66.85	—
<b>Finishing costs, \$</b>					
Yardage <sup>g</sup>	30.32	30.32	26.49	26.49	54.90
Feed <sup>h</sup>	162.81	158.93	153.7	153.32	227.02
Total costs, \$	915.78	890.80	911.70	918.33	940.91
Final weight, lb <sup>i</sup>	1132	1185	1233	1226	1214.00
Slaughter breakeven \$/100 lb	80.90	75.17	73.94	74.90	77.50

<sup>a</sup>Initial weight x \$102/100 lb for forage calves; \$98/100 lb for high-grain calves

<sup>b</sup>9% interest rate.

<sup>c</sup>Health costs = implants, fly tags, etc.

<sup>d</sup>Stalk grazing=106d @\$.12/d; wheat straw=68d @\$.20/d; yardage=174d @\$.10/d.

<sup>e</sup>Supplement=174d @\$.1025/d; 2 lb/d (as fed).

<sup>f</sup>Grazing costs=\$.35/hd/d.

<sup>g</sup>\$.30/day.

<sup>h</sup>Average diet cost = \$.06/lb DM and 9% interest for 1/2 of feed.

<sup>i</sup>Calculated from hot carcass weight adjusted for 62% dressing percentage.

## Nutrient Needs

**Energy.** Grain may be necessary in many rations to produce the desired gain. As the amount of grain increases in the ration, the level of gain will also increase. However, supplemental energy also lowers the level of roughage digestion. Corn silage usually contains about 40 to 50 percent grain on a dry basis. Additional grain appears to reduce utilization of the roughage portion of corn silage. When alfalfa or grass forages are fed, 4 to 6 pounds of grain per head per day may be needed for calves to gain 1.5 pounds or more per day. Quality of the roughage used, condition of cattle, and severity of weather will have considerable impact on rate of winter gain. High-energy, fibrous by-products (soyhulls, gluten

feed, beet pulp) may replace corn grain to increase energy consumption with less negative associative effects on forage digestion. In addition, there will be less incidence of digestive problems (founder, etc.).

**Protein.** Cattle under 600 pounds that are fed growing rations usually gain faster when supplemented with "natural" plant protein compared to nonprotein nitrogen substitutes such as urea or biuret. However, feeding plant protein does not necessarily guarantee greater profits. Growing rations containing urea and bypass protein will achieve calf gains similar to natural plant protein and may improve profits.

**Minerals.** Phosphorus is often deficient in high roughage rations. It can be added in the protein supplement or by feeding a high phosphorus mineral supplement (greater than 9 percent phosphorus). A mixture of 50 percent salt and 50 percent dicalcium phosphate offered free-choice supplies adequate phosphorus supplementation. In most areas of Nebraska, trace minerals appear to be adequate. Trace minerals are usually included in commercial mineral and protein supplements or trace mineralized salt may be fed. Supplements with high levels of trace minerals should only be considered after a thorough analysis confirms that a trace mineral deficiency exists.

**Vitamins.** Vitamin A may not be needed if calves are grazing lush grass or fed green hay that has not been stored for more than a year. If supplementation is needed, feed at 10,000 to 15,000 IU per head daily. Vitamin D supplementation is necessary for calves grown in confinement buildings during the winter months. Animals can obtain Vitamin D as a result of sunlight acting on sterols found on the skin that are converted to Vitamin D. If calves are grown in confinement buildings this process cannot occur. Sun-cured forages are a good source of Vitamin D. Also, most commercial supplements contain some Vitamin D.

## Ration Formulation

The ration formula depends on requirements of cattle being fed and quality of feeds used (*Table IV*). For gains of 0.5 to 1 pound, roughage alone may provide enough energy and protein. When a lower quality roughage such as full bloom prairie hay is fed, additional rumen degradable protein is usually needed. Grain feeding will seldom be necessary. Some roughages and silages may have sufficient energy that they may need to be limit fed to restrict gains to less than 1 pound per day. For these low gains, it may be most economical to consider grazing calves on crop residues, meadow regrowth, or other forages and supplement with a rumen degradable protein.

When gains of 1 to 2 pounds are desired, lighter weight cattle need a higher percentage of concentrates than older cattle due to the high energy requirement for gain (NEg) relative to that for maintenance (NEm). Lighter cattle also have lower intakes.

**Feed Additives and Implants.** A program should be developed by each producer to take full advantage of feed additives and implants. Implants increase gains from 8 to 10 percent over controls. However, where gains are less than 1.5 pounds per day, the increase in performance may not economically justify the use of an implant, especially when compensatory growth is considered.

The addition of ionophores to growing rations should improve feed utilization and, therefore, increase gain about 10 percent. The ionophore-containing supplement may be fed daily or on alternate days with satisfactory performance. The feed additives may be incorporated into the protein or energy supplement if the ration requires supplements. If the ration does not require any extra supplements, it still may be economical to consider adding an ionophore because they can be purchased in a concentrated form and low quantities fed daily (e.g. .2 to .3 pounds/head).

**Table IV. Example rations for different rates of gain for growing calves<sup>a</sup>.**

	<b>300-400 lb .5-1 lb ADG lb</b>	<b>300-400 lb 1-1.5 lb ADG lb</b>	<b>300-400 lb 1.5-2 lb ADG lb</b>	<b>400-500 lb .5-1 lb ADG lb</b>	<b>400-500 lb 1-1.5 lb ADG lb</b>	<b>400-500 lb 1.5-2 lb ADG lb</b>	<b>500-700 lb .5-1 lb ADG lb</b>	<b>500-700 lb 1-1.5 lb ADG lb</b>	<b>500-700 lb 1.5-2 lb ADG lb</b>
<b>1. Corn Silage</b>	3.0	—	—	—	18	6.5	—	18.0	14.0
Alfalfa hay, mid bloom	7.5	6.0	4.5	12.0	5.5	5.0	14.5	7.5	5.5
Corn	—	3.0	5.0	—	—	4.0	—	—	3.0
Dicalcium Phosphate <sup>c</sup>	.03	.04	.04	.02	.04	.03	.02	.03	.05
<b>2.Sorghum Silage</b>	19.0	14.5	10.5	26.0	21.0	16.0	—	30.0	23.0
Corn	—	2.5	3.5	—	2.0	4.0	—	1.0	3.5
40% Supplement <sup>b</sup>	1.0	.7	1.2	1.1	1.3	1.4	—	1.5	1.7
Dicalcium Phosphate <sup>c</sup>	.01	.05	.01	—	.03	.05	—	.02	.05
<b>3.Prairie hay, early bloom</b>	7.0	5.0	4.0	10.0	7	5.5	12.5	11.5	8.0
Corn	.5	2.5	4.0	—	3	5	—	3.5	5.0
40% Supplement <sup>b</sup>	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.7	1.7
Dicalcium Phosphate <sup>c</sup>	.02	.05	.08	—	.02	.06	.01	—	.06
<b>4.Corn stalks</b>	—	—	—	grazing	—	—	grazing	—	—
40% supplement <sup>b</sup>	—	—	—	1.5	—	—	1.5	—	—
or									
Alfalfa hay	—	—	—	4.3	—	—	4.3	—	—
<b>5.Ammoniated wheat straw</b>	—	—	—	ad lib <sup>d</sup>	—	—	ad lib <sup>d</sup>	—	—

<sup>a</sup> Amount of feed is on an "as is" basis. Rations are balanced using average nutrient composition of each feed. We recommend that forages be sampled, tested for nutrient content, and rations adjusted accordingly.

<sup>b</sup>The supplement is an all-natural protein source. The alfalfa hay is assumed to be 16% crude protein and 88% dry matter.

<sup>c</sup>Provides a source of phosphorus. Could use a commercial mineral mix that contains 8-10% phosphorus.

<sup>d</sup>Ad lib means all that the calves will eat.



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