

AGRICULTURAL ALTERNATIVES

Beef Backgrounding Production

Backgrounding is a beef production system that uses pasture and other forages from the time calves are weaned until they are placed in a feedlot. Calves generally gain from 400 to 800 pounds, depending on the quality of available forages, ration fed, and length of time involved. The weight gain comes primarily from muscle and frame development, with little from fattening. These gains are accomplished as economically as possible by making maximum use of forages such as pasture, hay, and silage. Little, if any, grain is used in most backgrounding programs.

Marketing

Before selecting a backgrounding program, be sure you have a good marketing plan. A marketing plan might include putting cattle in your own feedlot for finishing or selling them as feeders.

Calves should be grouped according to quality, weight, and sex to increase their value at market time. All animals should be preconditioned. Preconditioning includes weaning about 6 weeks before normal sale time, starting on feed, dehorning, vaccinating for respi-

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ratory disease, deworming, castrating males, and perhaps implanting them with a growth promotant. These practices help ensure that the calves will stay healthy and have a good start in a backgrounding program.

Not every calf is suited for a backgrounding program. Generally, calves less than 8 months of age in above-average body condition are not suitable because they lose weight and condition rapidly when fed high-roughage rations. The system is suitable for a cow-calf operation where backgrounding heifer calves would allow for a better selection of replacement heifers.

Steer calves weighing 400–600 pounds in thin to moderate condition are best suited for most backgrounding programs. These calves are ready for finishing when they reach 850–1,000 pounds and usually are in high demand by cattle feeders.

Backgrounding requires some additional time to finish an animal. However, the savings gained by purchasing less feed grains during the major growth phase

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generally outweigh the extra finishing time. Rather than feeding lightweight calves high-concentrate rations early on, cattle feeders often buy heavier-weight cattle in hopes of reducing the grain requirements for producing finished beef.

Calf and Forage Management

A successful backgrounding program requires skillful cattle and forage management combined with a good preventative health plan. Often, calves being weaned and transported are stressed and highly susceptible to pulmonary-related diseases. A high death-loss rate can quickly erase potential profits. A sound health program developed with the aid of a veterinarian is strongly recommended. The program should include handling before and after weaning or before and after shipment in the case of purchased cattle. Well-designed animal handling facilities are essential for a successful health program.

Good forage management can be achieved by harvesting forages at their optimum stage of maturity for highest nutrient content. Pastures should include a mixture of legumes and grasses. Legumes increase forage yield and protein content and will prevent the drastic reduction in pasture production and quality that often occurs during the summer months.

With home-grown calves, weaning stress can be reduced somewhat by providing good-quality mixed hay and 2 pounds of corn daily for 2–3 weeks before weaning. This practice will also acclimate calves to eating dry feeds from troughs. When purchasing calves, provide first-cutting grass-legume hay, offer small amounts of grain, and increase the amount over a week to 10 days to about 2 pounds per head daily.

Corn silage will usually have to initially be offered in small amounts and increased as intake increases over a week to 10 days. Round-bale silage is an excellent exclusive feed for backgrounding calves, particularly when the feed is a grass-legume mixture. However, it is important to:

- Design the feeders so smaller calves to have access to the balage
- Monitor hay consumption because spoilage can occur if hay is not eaten fast enough
- Check to make sure the balage is not frozen during very cold weather

Urea supplements used as a protein source are not well utilized by new cattle at the onset of a high-roughage-based feeding program.

Calcium supplements mixed with salt (two parts commercial salt mix with supplemental vitamin A to one part limestone) should be available free-choice when using corn silage and grain diets. Most hay and balage of reasonable quality will contain sufficient cal-

cium and phosphorus, but the commercial salt mixture (not trace-mineralized salt blocks) that contains supplemental vitamin A should be available free-choice.

It is also important to provide adequate quantities of clean, fresh, frost-free water for calves at all times. Likewise, it is equally important to check that all calves have found the water. Discuss the use of growth promotants with your veterinarian. Heifers that may be saved for replacements should not be implanted.

Preventative Health Management

Some important preventative health management practices include the following:

- Vaccinations and boosters (IBR, BVD, PI3, BRSV, and 7 Clostridial strains)
- Deworming
- Implantation of growth promotants
- Proper identification (ear tags)

Vaccinations should be given when purchased cattle arrive or at weaning. It is very important that a veterinarian become involved in developing and implementing an effective preventative health program. If possible, castration and dehorning should be done a minimum of two weeks before weaning. Purchased bull calves should not be castrated until they are acclimated and have recovered from stress. Depending on the weather, the recommended waiting period is 10–15 days. Deworming and treatment for external parasites should be done separately from other practices to avoid excessive stress.

Backgrounding Feeding Programs

Once calves have recovered from weaning or shipping stress (2–4 weeks), they are ready to be placed in a backgrounding program. The program to be followed will depend on when the calves were born (spring or fall) and available feedstuffs. A number of wintering rations using various feeds that will result in different rates of weight gain are shown in Table 1.

Initial Resource Requirements

- Land: $\frac{3}{4}$ acre
- Total labor: 2 hours
- Capital
 - Calves: \$280
 - Buildings and equipment: \$50

Table 1. Suggested winter rations for backgrounding 400- to 600-pound calves (lbs per day).

Feed	Ration							
	1	2	3	4	5	6	7	8
Grass hay (late cut)	12-14							
Ground corn cobs	10-12		7-9					
Grass-legume hay (early cut)	12-14			10-12				
Legume hay (early cut)	12-14							
Corn residue silage (65% moisture)					30-35			
Corn silage (65% moisture)					10-15		30-35	
Corn grain							3-4	
Protein supplement (32% protein) ^a	1	3			2	2	2	
Mineral mixture ^b	FC ^c	FC	FC	FC	FC	FC	FC	FC
Expected daily gain (pounds)	0.5	0.5	0.75	1.0	1.0	1.0	1.25	1.75

^aThe supplement should contain 15,000 IU of vitamin A per pound.
^bAdd 2 parts dicalcium phosphate and 1 part trace-mineralized salt.
^cFC = free choice.

Backgrounding Systems for Spring-Born Calves

The following four management/feeding options vary primarily in the duration of the feeding period, choice of ration, and final target weight. The condition common to all options is that 400- to 600-pound calves are weaned or purchased in the fall.

Option A (average target weight of 740 pounds)

This option involves 30 days of grazing on fall pasture or corn crop residues followed by 165 days of winter feeding. After the winter feeding period, the calves are put on spring pasture (usually in mid-May) for 50 days, and then sold in early July.

On fall pasture, the calves should gain 1.5–1.75 pounds per day. No supplemental protein or energy is required. However, if calves are grazed on corn crop residues, they should receive 2.0 pounds of a 32 percent protein supplement daily. The wintering ration could consist of the first seven rations listed in Table 1. The choice of ration depends on the feeds that you have available. Ration 5, which is a full-feed or corn silage ration, is not recommended because calves will prob-

ably be carrying too much flesh to make good use of pasture the following spring.

If calves are wintered on rations 1, 2, 3, 4, 6, 7, or 8, they should gain about 150–200 pounds by spring. After being wintered at this level, they should gain 1.75–2.0 pounds per day during the 50 days on spring pasture. Stocking rate on pasture should be about two head per acre.

Option B (average target weight of 825 pounds)

This option likewise involves 30 days of grazing on fall pasture or stubble fields. The differences are:

- Choice of winter ration
- Cattle are carried on pasture an additional 80 days or until early October rather than being sold in early July

Because pasture growth and quality are reduced during mid-summer, daily gains on pasture will drop in most years. In this program, if supplemental grain is fed during the mid-summer grazing season, stocking rates and growth rates are similar to those during the use of spring pasture.

The 165-day winter-feeding period uses corn silage and a protein supplement (ration 7 or 8). Calves should gain 280–360 pounds on these rations. Thus, calves would weigh 800–1,000 pounds after the winter feeding period.

If you decide to feed ration 8, cattle should go directly to a feedlot. Grain supplementation should be considered only if the cattle are being finished for slaughter or if a price premium exists for having cattle started on a feedlot ration. This program would require 2.5–3.0 tons of corn silage, approximately 250 pounds of protein supplement, and 20–30 pounds of salt-mineral mixture per head.

Backgrounding Systems for Fall-Born Calves

The following two management/feeding systems involve fall-born calves weighing 400–600 pounds that are weaned or purchased in June the following year. One option would be to take advantage of pasture gain for the season (June through October) and sell the animals as yearlings. The other option would be to continue feeding for low-cost gains through the coming winter and sell the cattle as heavy feeders in the spring.

Option C (average target weight of 625 pounds)

Because pasture is available after weaning, one alternative is to graze calves 160 days on pasture until late

October to mid-November and sell them as feeders (yearlings) in the fall. Calves managed in this manner should gain 150–200 pounds during the summer and fall grazing periods, provided the pasture contains some legumes. Only a salt-mineral mixture would be required in addition to the pasture.

Option D (average target weight of 800 to 1,000 pounds)

With this option, the fall-born calves from option C are retained and carried over the winter as long yearlings. Because they are heavier and have more frame going into the winter than spring calves, these animals have sufficient capacity to use low-quality roughage such as corn crop residue and stockpiled grasses. Supplemental protein, vitamin A, and phosphorus would be required when grazing these lower-quality roughages. Feeding 2 pounds of a 32 percent supplement fortified with vitamin A and phosphorus along with the roughage should provide sufficient energy and protein for yearling cattle to gain 0.5–0.75 pound per day. When most of the dropped grains, shucks, and leaves are gleaned from corn crop residue and stockpiled grasses becomes limited, hay or other roughage should be provided for the remainder of the winter. The rations shown in Table 1 could be modified by increasing the roughage levels 25–30 percent to meet the requirements of the heavier-weight yearlings. Using a ration that provides at least 1.5 pounds of daily gain would result in these heavy feeders weighing 850–1,000 pounds and being ready for market or finishing the following spring.

Environmental Impacts

In the normal course of operations, farmers handle pesticides and other chemicals, may have manure to collect and spread, and use equipment to prepare fields and harvest crops. Any of these routine on-farm activities can be a potential source of surface or groundwater pollution. Because of this possibility, you must understand the regulations to follow concerning the proper handling and application of chemicals and the disposal and transport of waste. Depending on the watershed where your farm is located, there may be additional environmental regulations regarding erosion control, pesticide leaching, and nutrient runoff. Contact your soil and water conservation district, extension office, zoning board, state departments of agriculture and environmental protection, and your local governing authorities to determine what regulations may pertain to your operation.

Risk Management

You should carefully consider how to manage risk on your farm. First, you should insure your facilities and equipment. This may be accomplished by consulting your insurance agent or broker. It is especially important to have adequate levels of property, vehicle, and liability insurance. You will also need workers' compensation insurance if you have any employees. You may also want to consider your needs for life and health insurance and if you need coverage for business interruption or employee dishonesty. For more on agricultural business insurance, see *Agricultural Alternatives: Agricultural Business Insurance*.

Second, check to see if there are multiperil crop insurance programs available for your crop or livestock enterprises. There are crop insurance programs designed to help farmers manage both yield risk and revenue shortfalls. However, individual crop insurance coverage is not available for all crops. If individual coverage is not available for what you grow, you may be able to use the AGR/AGR-Lite program to insure the revenue of your entire farm operation. To use AGR-Lite you must have 5 years of Internal Revenue Service (IRS) Schedule F forms. For more information concerning crop insurance, contact a crop insurance agent or check the Pennsylvania crop insurance education website at extension.psu.edu/crop-insurance.

Finally, the USDA Farm Service Agency has a program called the Non-insured Assistance Program (NAP), which is designed to provide a minimal level of yield risk protection for producers of commercial agricultural products that don't have multiperil crop insurance coverage. NAP is designed to reduce financial losses when natural disasters cause catastrophic reduction in production. NAP coverage is available through your local USDA Farm Service Agency office. The application fee for this program may be waived for eligible limited-resource farmers.

Sample Budgets

Four sample budgets are included that summarize costs and returns for backgrounding beef calves. The budgets were developed for options A–D and should help ensure that you include all costs and receipts in your calculations. Costs and returns are often difficult to estimate in budget preparation because they are numerous and variable. Think of these budgets as an approximation and make appropriate adjustments using the “Your Estimate” column to reflect your specific production conditions. Additional livestock budgets can be found in the Agricultural Alternatives website (extension.psu.edu/ag-alternatives). More information on using livestock budgets can be found in *Agricultural Alternatives: Enterprise Budget Analysis*.

For More Information

Publications

Comerford, J. W., L. F. Kime, K. E. Knoll, and J. K. Harper. *Agricultural Alternatives: Dairy-beef Production*. University Park: Penn State Cooperative Extension, 2008.

Greaser, G. L., and J. K. Harper. *Agricultural Alternatives: Enterprise Budget Analysis*. University Park: Penn State Cooperative Extension, 1994.

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Websites

University of Missouri Extension's Animal Publications: muextension.missouri.edu/xplor/agguides/ansci/

Oklahoma State University Department of Animal Science's Breeds of Livestock: ansi.okstate.edu/breeds/index.htm

Sample Budget for Spring-Born Calves—Option A

Bought at 400 pounds and sold in early July the next year at 750–850 pounds; fed during winter and spring (800 pounds used in this example)

Item	Quantity	Unit	Price	Total per Animal	Your estimate
Variable costs					
Feeder calf	400	pounds	\$1.32	\$528.00	_____
Fall, spring, and summer grazing periods					
Pasture maintenance	0.5	acre	\$40.30	\$20.15	_____
Corn crop residue	0.2	tons	\$10.00	\$2.00	_____
Concentrate (32%)	33	pounds	\$0.15	\$4.95	_____
Dry lot					
Hay (mixed grass and legume)	1.25	tons	\$180.00	\$225.00	_____
Concentrate (32%)	4	cwt	\$0.15	\$0.60	_____
Salt and minerals	33	pounds	\$6.67	\$220.11	_____
Total feed cost				\$472.81	_____
Health				\$14.00	_____
Marketing and trucking				\$10.00	_____
Supplies and miscellaneous				\$1.00	_____
Interest on operating capital				\$30.47	_____
<i>Total variable costs</i>				\$1,056.28	_____
Fixed costs					
Labor	2	hours	\$8.00	\$16.00	_____
Building					
Fencing (exterior)	0.5	acre	\$6.25	\$6.25	_____
Watering	0.5	acre	\$1.00	\$1.00	_____
Fencing (interior)	0.5	acre	\$3.94	\$3.94	_____
Interest on investment				\$49.02	_____
Insurance				\$8.25	_____
Repairs				\$16.51	_____
Depreciation				\$168.39	_____
<i>Total fixed costs</i>				\$269.36	_____
Total costs				\$1,325.64	_____

Net returns over costs selling 800-pound feeders (788 pounds includes 1.5% death loss).

Prices Received	\$1.50	\$0.78	\$1.55	\$1.60	\$1.65	\$1.70
Net returns over variable costs	\$135.72	\$56.00	\$175.12	\$214.52	\$253.92	\$293.32
Net returns over total cost	\$(133.64)	\$41.00	\$(94.24)	\$(54.84)	\$(15.44)	\$23.96

Sample Budget for Spring-Born Calves—Option B

Bought at 400 pounds and sold in early July the next year at 850–950 pounds; fed during fall, winter, and spring (900 pounds used in this example)

Item	Quantity	Unit	Price	Total per Animal	Your estimate
Variable Costs					
Feeder calf	400	pounds	\$1.32	\$528.00	_____
Fall, spring, and summer grazing periods					
Pasture maintenance	1	acre	\$40.30	\$40.30	_____
Corn crop residue	0.2	tons	\$10.00	\$2.00	_____
Concentrate (32%)	33	pounds	\$0.15	\$4.95	_____
Dry lot					
Hay (mixed grass and legume)	1.2	tons	\$180.00	\$180.00	_____
Concentrate (32%)	720	pounds	\$0.15	\$108.00	_____
Salt and minerals	33	pounds	\$6.67	\$220.11	_____
<i>Total feed costs</i>				\$591.36	_____
Health				\$14.00	_____
Marketing and trucking				\$10.00	_____
Supplies and miscellaneous				\$1.00	_____
Interest on operating capital				\$34.03	_____
<i>Total variable costs</i>				\$1,178.39	_____
Fixed costs					
Labor	2	hours	\$8.00	\$16.00	_____
Building					
Fencing (exterior)	0.5	acre	\$6.25	\$6.25	_____
Watering	0.5	acre	\$1.00	\$1.00	_____
Fencing (interior)	0.5	acre	\$3.94	\$3.94	_____
Interest on investment				\$49.02	_____
Insurance				\$8.25	_____
Repairs				\$16.51	_____
Depreciation				\$168.39	_____
<i>Total fixed costs</i>				\$269.36	_____
Total costs				\$1,447.75	_____

Net returns over variable costs selling 900-pound feeders (866.5 pounds equals 1.5% death loss.)

Prices Received	\$1.20	\$1.25	\$1.30	\$1.35	\$1.40	\$1.45
Net returns over variable costs	\$(128.59)	\$(85.27)	\$(41.94)	\$1.38	\$44.71	\$88.03
Net returns over total cost	\$(397.95)	\$(354.63)	\$(311.30)	\$(267.98)	\$(224.65)	\$(181.33)

Sample Budget for Fall-Born Calves—Option C

Bought at 400 pounds the previous spring and sold in November at 625 pounds; grazed during the summer and fall

Item	Quantity	Unit	Price	Total per Animal	Your estimate
Variable Costs					
Feeder calf	400	pounds	\$1.32	\$528.00	_____
Summer and fall grazing periods					
Pasture maintenance	0.7	tons	\$40.30	\$28.21	_____
Salt and minerals	22	pounds	\$6.67	\$146.74	_____
<i>Total feed costs</i>				\$174.95	_____
Health				\$8.00	_____
Marketing and trucking				\$10.00	_____
Supplies and miscellaneous				\$1.00	_____
Interest on working capital				\$21.36	_____
<i>Total variable costs</i>				\$743.31	_____
Fixed costs					
Labor	2	hours	\$8.00	\$16.00	_____
Building					
Fencing (exterior)	0.4	acre	\$5.00	\$5.00	_____
Fencing (interior)	0.4	acre	\$3.15	\$3.15	_____
Watering	0.4	acre	\$0.80	\$0.80	_____
Interest on investment				\$49.02	_____
Insurance				\$8.25	_____
Repairs				\$16.51	_____
Depreciation				\$163.39	_____
<i>Total fixed costs</i>				\$262.12	_____
Total costs				\$1,005.43	_____

Net returns over variable costs selling 740-pound feeders (616 pounds equals 1.5% death loss.)

Prices Received	\$1.50	\$1.55	\$1.60	\$1.65	\$1.70
Net returns over variable costs	\$190.69	\$221.49	\$252.29	\$283.09	\$313.89
Net returns over total cost	\$(71.43)	\$(40.63)	\$(9.83)	\$20.97	\$51.77

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Sample Budget for Fall-Born Calves—Option D

Bought at 400 pounds in the spring and sold in spring at 850–1,000 pounds; fed during winter and spring (900 pounds used in this example)

Item	Quantity	Unit	Price	Total per Animal	Your estimate
Variable Costs					
Feeder calf	400	pounds	\$1.28	\$512.00	_____
Summer and fall grazing periods					
Pasture maintenance	0.5	acre	\$40.30	\$20.15	_____
Salt and minerals	22	pounds	\$6.67	\$146.74	_____
Winter and spring feeding					
Stubble grazing	0.52	tons	\$10.00	\$5.20	_____
Hay (mixed grass and legume)	0.73	tons	\$180.00	\$131.40	_____
Concentrate (32%)	800	pounds	\$1.15	\$120.00	_____
Salt and minerals	32	pounds	\$6.67	\$213.44	_____
<i>Total feed costs</i>				\$494.59	_____
Health				\$8.00	_____
Marketing and trucking				\$10.00	_____
Supplies and miscellaneous				\$1.00	_____
Interest on working capital				\$30.47	_____
<i>Total variable costs</i>				\$1,202.67	_____
Fixed costs					
Labor	2	hours	\$8.00	\$16.00	_____
Building					
Fencing (exterior)	0.5 ac		\$6.25	\$6.25	_____
Watering	0.5 ac		\$1.00	\$1.00	_____
Fencing (interior)	0.5 ac		\$3.94	\$3.94	_____
Interest on investment				\$49.02	_____
Insurance				\$8.25	_____
Repairs				\$16.51	_____
Depreciation				\$163.39	_____
<i>Total fixed costs</i>				\$264.36	_____
Total costs				\$1,467.03	_____

Net returns over variable costs selling 900-pound feeders (886.5 pounds equals 1.5% death loss.)

Prices Received	\$1.20	\$1.25	\$1.30	\$1.35	\$1.40
Net returns over variable costs	\$(128.87)	\$(84.54)	\$(40.22)	\$4.11	\$48.43
Net returns over total cost	\$(393.23)	\$(348.90)	\$(304.58)	\$(260.25)	\$(215.93)