

Housing Requirements for Backgrounding Beef Cattle

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Backgrounding refers to growing, feeding and managing steers and heifers from weaning until they enter the feedlot, where they are placed on a high-energy finishing ration. Backgrounding involves the feeding of a predominately forage-based diet where some grain may be fed. The process of backgrounding is used to control weight gain so that cattle gain enough muscle and bone before laying down fat covering and marbling in the feedlot. Typically backgrounding involves raising cattle up to about 410 kg (900 lb) body weight.

This factsheet provides general knowledge on confined housing systems (barn and yard) for backgrounding cattle. It includes critical design features that should be considered in planning a barn for backgrounding cattle.

HOUSING

Keep housing as simple as possible. It may be possible to use existing barns or to build simple structures like fabric-covered buildings, etc. A well-drained yard with a good windbreak may also be a suitable alternative. The primary purpose of housing is to provide shelter from extreme weather conditions. However, cattle can be kept outdoors if they have protection from the weather.

The National Farm Building Code as referenced in the Ontario Building Code (under the *Ontario Building Code Act, 1992*) is the main regulation

that governs farm building construction in Ontario. Producers are required to obtain building permits to construct, expand or renovate all farm buildings. The construction may be subject to other requirements under the *Nutrient Management Act* and the *Planning Act* (for Minimum Distance Separation). More information can be found in the OMAFRA factsheet *Building Permit Requirements to Construct, Expand or Renovate Farm Buildings*. The publication is available on the OMAFRA website (ontario.ca/omafra).

The National Farm Animal Care Council (NFACC) *Code of Practice for the Care and Handling of Beef Cattle* (Code) requires all indoor and outdoor housing facilities to be well-drained and provide a comfortable resting area for cattle. The Code also requires all group housing facilities to have enough space for all animals to adopt normal resting postures at the same time.

When determining how much space is required for the backgrounding cattle, consider the actual usable lying space rather than the total size (footprint) of the barn. Space needed for feeders and waterers, as well as alley space and space next to the feeders should not be considered as suitable lying areas for resting. This area should be deducted when calculating actual usable lying space. Table 1 shows recommended space requirements (lying space) for calves and finishing cattle.

Table 1. Housing Space Requirements for Beef Cattle

Housing Type	Area per animal	
	Calves 182–363 kg (400–800 lb)	Finishers 363–545 kg (800–1,200 lb)
Barn without yard	1.8–2.8 m ² (20–30 ft ²)	2.8–3.8 m ² (30–40 ft ²)
Barn with yard		
Barn area	1.4–1.8 m ² (15–20 ft ²)	1.8–2.8 m ² (20–30 ft ²)
Outside yard (paved)	3.8–4.6 m ² (40–50 ft ²)	4.6–5.6 m ² (50–60 ft ²)
Outside yard (unpaved)	18.5–23 m ² (200–250 ft ²)	23–46 m ² (250–500 ft ²)
Yard without barn		
Paved	4.6–5.6 m ² (50–60 ft ²)	5.6–7.4 m ² (60–80 ft ²)
Unpaved (with mounds)	14–28 m ² (150–300 ft ²)	23–46 m ² (250–500 ft ²)
Unpaved (without mounds)	28–56 m ² (300–600 ft ²)	37–74 m ² (400–800 ft ²)

The total floor area of the barn/yard will be higher when other space requirements for alleys, feed bunk and waterers are considered. The area per animal should be increased for unpaved surfaces to minimize mud. Mud makes it harder for animals to move around and takes extra energy during movement. That loss of energy can reduce gain.

FEED AND WATER

The Code requires producers to ensure that feed and water of adequate quality and quantity to fulfil the nutritional and physiological needs of cattle are provided. The feeding and watering practice should be adjusted based on continuous monitoring of feeding habits, behaviour, performance and the health of animals.

The Code requires cattle to have daily access to adequate quality and quantities of palatable (drinkable) water to meet their physiological needs.

The water requirement of backgrounding cattle will depend on a number of factors, including weight of the animal, air temperature and relative humidity, rate of gain, level of dry matter intake, moisture content of the ration, level of activity and access to shade. Table 2 shows approximate total daily water intake for cattle with different weights and at different air temperatures.

Open surface water tanks are best for training calves. Allow minimum 30 cm (1 ft) of tank or waterer space for every 20 head as a good starting point. If energy-free water bowls are used, be sure to block open the lids or balls, so that the calves can see the water until they are trained.

To ensure adequate access to feed, cattle should be grouped according to age, sex, weight and body condition score. Grouping according to body condition score will allow extra feed to be provided to thinner cattle, prevent cattle in good condition from getting over conditioned and help control costs by more efficiently using expensive grains.

Table 2. Approximate Total Daily Water Intake of Cattle

Cattle Class	Weight	Air Temperature					
		To 4°C	10°C	14°C	21°C	27°C	32°C
Growing cattle	180 kg (400 lb)	15 L	16 L	19 L	22 L	25 L	36 L
	275 kg (600 lb)	20 L	22 L	25 L	30 L	34 L	48 L
	365 kg (800 lb)	23 L	26 L	30 L	35 L	40 L	57 L

Adapted from: *Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000*, National Research Council.

Round bale feeders are the most economical method of setting up a hay/haylage feeding system for backgrounding calves. A 20-cm (8-in.) bar spacing is suitable for calves, but 800-lb cattle may require a 25-cm (10-in.) spacing. Fence line feeders are also popular in backgrounding cattle operation. Table 3 shows recommended feed space requirements for fence line feeders. Round bale feeders are not suitable for feeding grains or corn silage. In these situations, a feeding trough that allows unrestricted access to feed should be provided.

Creep feeding is the practice of providing supplementary grains to calves before weaning to help increase preweaning weights and reduce the stress of weaning. Where this practice is continued after weaning, adequate provision of space is important to allow access by all cattle to feed. The feed space requirement shown in Table 3 can also be used as a recommended standard for creep feeding.

Backgrounded cattle should have access to salt and mineral. The amount of salt and mineral to be fed depends on the nutritional status of the forage and if a grain supplement is being fed. Salt and mineral should be placed close to water troughs to encourage intake. Access to salt is important to both encourage intake of mineral and water and to limit the risk of over-consumption of free choice mineral. Where salt and/or mineral is provided as a molasses lick, these licks should be placed where they will not be contaminated by faeces.

Table 3. Fence Line Feeder Space Requirements

Feeder Space	Space per animal	
	Calves 180–365 kg (400–800 lb)	Finishers 365–545 kg (800–1,200 lb)
Limit feeding	46–56 cm (18–22 in.)	56–74 cm (22–26 in.)
Self-fed grain	8–10 cm (3–4 in.)	10–15 cm (4–6 in.)
Self-fed roughage	23–25 cm (9–10 in.)	25–28 cm (10–11 in.)
Maximum height at throat	46 cm (18 in.)	56 cm (22 in.)

Cattle are normally housed in simple unheated structures. Cattle react to falling temperatures by growing a thick hair coat without having to change their feed requirements. Once below the “thermoneutral zone (TNZ)”, (i.e., the temperature range where the animal does not have to expend any additional energy to maintain body temperature), cattle must increase their energy intake through higher feed consumption to maintain body temperature. Figures for the TNZ assume a dry, clean hair coat. Wet or mud-covered coats reduce the insulating benefits of a thick hair, meaning animals will reach the lower end of their TNZ at a higher temperature than with a dry, clean coat. It is generally accepted that for every 1°C temperature drop below the TNZ, there is a 2% increase in energy requirement. According to the American Dairy Science Association publication on beef cattle, the TNZ generally ranges between 10°C and 30°C for most cattle less than 1 month old, between –15°C and 28°C for a mature beef cow consuming a maintenance diet and between –35°C and 25°C for yearlings with free choice access to energy-dense feedlot diets.

More information on feed intake adjustments for different environmental factors can be found on the OMAFRA website under *Beef Cow Winter Feed Utilization*.

Cattle, like people, also experience the “effective temperature,” which takes into account both temperature and wind speed. Wind blowing over an animal draws heat away from the animal, making the animal significantly colder. The provision of a shelter belt and placing the entrance of the shed away from the prevailing wind will reduce the impact of “effective temperature.”

VENTILATION

Ventilation is necessary to remove odours and gases from the barn and replace them with fresh air. In cold weather, the ventilation rate is calculated to remove excess moisture, and in hot weather, it is calculated to remove excess heat.

The *Code of Practice for the Care and Handling of Beef Cattle* requires producers to maintain indoor air quality and ventilation at all times. The Code requires the ammonia level to be less than 25 parts per million in the barn.

Natural ventilation using existing windows and doors is preferable because of cost. Natural ventilation relies on wind to ventilate a barn by the cross flow of air in one side and out the other, and on the fact that hot air rises. For natural ventilation to work properly, it is necessary to have both air inlets and exhaust openings from the barn. Windows can be used for both air inlets and air exhaust if they are adjustable and are spread evenly around the walls. Doors can also be used to ventilate the barn, but producers should be careful to avoid drafts. Drafts are simply air movements that cattle find uncomfortable. The temperature and speed of air movement will determine if the cattle feel a draft.

The barn must also have good exposure to the wind. The area surrounding the barn should be clear of any barriers that could obstruct the movement of air. Nearby buildings, lean-tos, a large barn bridge, (i.e., covered alley/walkway that connect barns, milking parlours etc.) or large tree lines could act as wind barriers during summer, making natural ventilation ineffective.

In cold weather, ridge or vertical air exhaust openings will be needed. These roof openings are critical for good winter ventilation because closed side curtains limit cross ventilation in winter. Roof openings are therefore necessary to vent out the rising warm moist air. In a two-storey barn, hay chutes can be used if they have an adjustable opening. Hay chutes should only be used as a temporary fix, since they will exhaust warm moist air into the mow area of the barn. If the moist air is not exhausted from the mow, it will condense

on the roof members and eventually lead to the destruction of the roof. The long-term solution is to install chimneys that will exhaust the air directly to the outside. If a machinery shed is used, chimneys or a continuous open ridge can be used to exhaust air.

It is better to keep cattle cold and dry rather than warm and damp. To keep the air fresh, open the barn as much as possible, while still controlling drafts. This may result in freezing in the barn, but it is better to have frozen manure than to close the barn too much to keep it warm. The result will be stale and heavy air because the moisture is not being removed from the barn. If the hair coat becomes damp and the air is stale and moist, cattle will be susceptible to several respiratory illnesses.

If the barn is not suitable for natural ventilation, it will be necessary to install one or more fans to provide for air exchange. Different air exchange rates should be considered for the summer and winter season. Ventilation for confined housing system should be designed by experienced professionals. More details on beef cattle ventilation can be found on the OMAFRA website under *Ventilation Basics for Beef Cattle*.

MANURE HANDLING

Scrape manure from around the feeders and waterers regularly, to keep cattle clean. The bedded pack can continue to build until clean-out is necessary. Cattle will need about 2 kg/head/day (4 lb/head/day) of bedding.

Typically, manure from beef operations is solid. Manure and manure-contaminated runoff from the livestock yard should be handled in compliance with different acts and regulations. See Ontario Regulation 267/03 for regulatory requirements in handling manure and manure-contaminated runoff from livestock yards.

If an outside yard is used, scrape on a regular basis. Storage facilities should be provided to store manure and runoff from the livestock yard. More information on managing manure in livestock yards can be found on the OMAFRA website

under *Managing Outdoor Confinement Areas and Livestock Yards*.

Solid manure storage facilities should be covered (roofed) to control runoff from the storage. Manure-contaminated runoff should be contained in a storage facility or can be treated through a vegetative treatment area. See the OMAFRA factsheet *Constructing a Permanent Solid Nutrient Storage Facility for Agriculture Source Materials* for more detail on solid manure storage facilities.

SUMMARY

The goal of backgrounding beef cattle is to control the growth of the animal so that maximum frame size is achieved before depositing the layer of fat. Proper housing, watering and feeding of cattle is critical in achieving this goal. Producers planning to background cattle should have a target end weight in mind and should follow industry standards to have better control over environment and nutrition. This will help to adopt better management practices, which is key to the success of backgrounding operations for beef cattle.

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