

Beef and Forage Technical Bulletin 5th Edition



Forage - Ammoniating low quality forages as an alternative winter feed source

Producers faced with the problem of storing high moisture feed or wanting to improve the feed value of low quality forages should consider ammoniation. Ammonia (NH₃), which contains nitrogen, increases the crude protein content and improves the energy by breaking down the poorly digested fibre of mature forages. Ammonia also acts as a preservative of higher moisture feeds by destroying molds and bacteria during the ammoniation process.

Factors affecting the response to ammoniation

Percentage of moisture in the roughage, the time of ammoniation, temperature and the amount of anhydrous ammonia applied are the key factors affecting forage response to the ammoniation process. When using ammonia to improve the protein content of low quality forages, it should be added at three to five per cent of the dry matter weight. As a preservative for high moisture forage, the ammonia level can be decreased to two per cent. Temperature determines the speed at which the reaction between ammonia and the feedstuff occurs, as well as the extent of improved digestibility.

The application of ammonia provides these advantages:

- increased forage digestibility (TDN) by 10 to 30 per cent
- increased forage intake by 10 to 20 per cent
- increased crude protein content (85 to 125 per cent in past Manitoba Agriculture trials when NH₃ injected at three per cent)

Manitoba Agriculture and Resource Development carried out a forage ammoniation project in the fall of 2020 to improve the feed value of low quality forages. Five different feeds were covered in 5 mil plastic and injected with anhydrous ammonia at 3.1 per cent of dry matter on October 1. The stack was uncovered in late November (covered for 7 weeks). Feed tests were taken prior and after ammoniation to determine the change in feed value. On average the protein increased 65 per cent but the energy dropped 8.1 per cent (3.9 TDN points). The cost of the ammonia and plastic worked out to 1.59 cents/lb. of dry matter and can range from \$30-40/ton (1.5 to 2 cents/lb.). The cold October may have impacted the ammoniation process and the change in digestibility (TDN). Based on past work an average increase in digestibility of 10 to 15 per cent can be assumed. Ammoniation is a viable option to improve low quality forages, especially in years when the cost of forage is high.



Product	Protein before NH ₃	Protein after NH ₃	% Increase	TDN (energy) before NH ₃	TDN after NH ₃	% Increase or Decrease
wheat straw	5.9	8.0	36	41.5	39.7	-4.3
wild hay	10.2	18.5	81.4	62.3	57.2	-8.2
alf/grass hay	11.3	17.7	56.6	54.9	53.1	-3.3
canola chaff	6.3	10.6	93.8	38.2	33.9	-11.3
wheat chaff	6.2	9.8	58	47.6	41.3	-13.2
Average	8.0	12.9	65.2	48.9	45.0	-8.1

Watershed Districts

Watershed districts are formed as a partnership between the province and local municipalities to protect, restore and manage land and water resources on a watershed basis. Manitoba's Watershed Districts offer a variety of programming to agriculture producers. For more information on Watershed Districts and program supports, visit: www.manitobawatersheds.ca



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Nitrate Management

Nitrate accumulation in forage can be the result of several factors including:

- 1. Level of fertilization.** High levels of nitrogen fertilizer or manure application may contribute to high nitrate levels in the forage.
- 2. Forage type.** Weeds and cereal crops are likely to contain higher nitrates than legumes and grasses. Seeds do not accumulate nitrates.
- 3. Forage maturity.** Early stages of cereals may contain higher nitrate levels.
- 4. Light intensity and temperature.** Poor light intensity increases nitrate accumulation. Increasing temperatures also increase the nitrate content.
- 5. Drought and frost.** Toxic levels of nitrates in forages are a possibility whenever normal growth of plants is disrupted by hail, drought, spray drift or frost.

If conditions improve and the plant starts actively growing, some of the accumulated nitrates may be used up in a few days. This usually occurs only in the top leaves which are exposed to sunlight. The bottom leaves, which are shaded, may still contain high levels of nitrates. Nitrates in feed are converted to nitrites during digestion. This reduces the oxygen-carrying capacity of the blood and the animal can die by suffocation.

Symptoms of severe nitrate poisoning include labored breathing, frothing at the mouth, rapid pulse, weakness, diarrhea, frequent urination, incoordination and convulsions. Death may occur in three to four hours. Non-fatal doses may result in loss of appetite, lowered milk production, slow growth and abortions in cows that recover. Nitrates in forages can be detected only by chemical analysis. If you suspect a problem, take a sample of the feed and send it to an accredited lab for analysis. Analysis at a feed testing laboratory will determine the actual level of nitrates and recommend corrective action.

Any amount of nitrate nitrogen over 0.5 per cent of the total ration dry matter should be regarded as potentially serious. Consult a veterinarian promptly when suspected cases of nitrate poisoning are found. Nitrate poisoning can be controlled by good management. High nitrate forages can be mixed with low nitrate level forages, thus reducing the overall toxicity of the ration. Feeding adequate levels of energy and vitamin A reduces the risk of nitrate toxicity. Ensiling forage tends to reduce nitrate levels by 40 to 60 per cent as fermentation reduces some of the nitrates to gas. Please contact the Livestock Extension staff for further information.

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Alternative Feeds for Winter Feed Supplies

With feed supplies in such short supply this year, many producers are looking for different options to secure enough feed for their herds for the winter. Alternative feeds can include crop residues, damaged crops, processing by-products, off grade grains and even weeds. Many of the alternative feeds vary widely in nutrient content, making an analysis or some assessment of the feed value necessary. Producers must know the energy, protein and major mineral levels of these feeds to develop balanced, least-cost diets for livestock. With alternative feeds, we recommend wet chemistry analysis to determine nutrient content.

Lower quality forages and a combination of straw is usually the first option, but they do not have sufficient levels of nutrients. If they are combined with grains, by-products, protein supplements and mineral and vitamin premixes, they can meet the nutrient needs. Animals need all the basic nutrients to maintain good health, body condition, high reproductive rates and desirable weaning weights. The nutritional requirements of beef herds change as the animals move through different physical stages. Other options for supplementing feed include, corn cracks, pea flour and oat hulls. The general nutritional requirements of the breeding herd are listed here:

Table 1. Nutritional requirements of the breeding herd¹

Class	Total Digestible Nutrients%	Crude Protein%	Calcium%	Phosphorus%
Mid Gestation	50-53	7	0.20	0.20
Late Gestation	58	9	0.28	0.23
Lactating	60-65	11-12	0.30	0.26
Replacement Heifers	60-65	8-10	0.30	0.22
Breeding Bulls	48-50	7-8	0.26	0.20
Yearling Bulls	55-60	7-8	0.23	0.23

¹Nutritional requirement varies with body weight, frame size, predicted average daily gain (ADG) and stage of production. Contact a Livestock Specialist for more ration advice. All rations must be balanced for protein, energy, vitamins and minerals.

Feeding higher quantities of low quality forage can cause issues. The intake of lower quality roughage will be restricted by the fibrous texture of the feed. This can be a problem, particularly when beef cows increase their intake in response to cold temperatures. Rumen compaction may occur, if the livestock are only fed straw and no readily available energy or protein supply for the rumen microbes. A high energy feed such as barley or corn will most likely be required. Adding additional protein and/or energy to feed is an option to increase intake and digestibility of poor quality feeds. In selecting the most economical option, a cost per pound of crude protein or TDN should be calculated to make direct comparisons. Visit Feedplan on the Manitoba Agriculture and Resource Development Website for assistance with the calculations. When you are sourcing cheaper feed grains, be aware of weed seeds and toxins such as ergot.

PLEASE REMEMBER: During cold periods, the energy component of the ration needs to increase by about 15 to 20 per cent, as the temperature goes to minus 20 degrees Celsius or lower. In the last trimester of pregnancy, the cows' nutrient needs also rise significantly. It is important to provide higher quality feed, in either the form of good quality alfalfa hay or more protein and energy supplements. It is important to save your best or highest quality feed for just prior to calving and after calving during lactation.

Farm Business Management - The Pros and Cons of Feeding Calves in a Tight Feed Year

Beef producers often check in at this time of year wondering about the idea of backgrounding some or all of their calves. The reasons for doing so differ from farm to farm, but usually relate to the desire to increase net returns on the herd, as a result of an abundance of feed or to target a different market time or size category. In a year such as this, some producers may be considering feeding their calves as a way to add pounds because of lower weaning weights due to poor pasture conditions. There are some factors to consider before taking this step.

Typically, there are three programs that encompass feeding calves post weaning, a 45 day interval, a 90 day interval and a 150 day feeding interval. All of these programs target 1.5 to 2.5 lb. of gain per day per animal.

Unless introduced to supplemental or creep feed while on pasture it is challenging to look at the 45 day feeding interval as an option for adding extra weight quickly due to the stress associated with weaning.

In a normal year, feed and other operating costs run roughly 25 per cent of the cost of backgrounding a calf for 150 days using a silage based ration while value of the animal accounts for 73 per cent of the cost structure.

On the surface, adding weight on the basis of additional feed delivery appears to be profitable, but factors affecting costs such as death loss, market fluctuations and yardage can result in reduced profit and even a financial loss. Trends over the last several years have favored better prices for heavier calves at weaning.

Although this year's calf crop returns are used for cash flow, going forward the breakeven cost is based on herd costs from the 2020 to 2021 season, so knowing your costs for the past year will be helpful in deciding what to do with the calf crop.

If we consider an operation that normally sells 550 lb. calves direct from pasture, but due to poor pasture conditions is looking at weaning weights of 440 lb. does it make economic sense to keep those calves back for extra feeding? Assuming all other things being the same with respect to animal condition and presentation at \$2.10/lb. for the 550 weights (\$1,155) in a normal year, the lighter calves would need to sell for \$2.625/lb. to return the same gross income. Often when pasture conditions stress the cow's ability to produce milk, calves can also appear more stressed and may not bring the premium prices, so variability in returns can be noticeable and prices potentially can be lower.

If this producer is in the position to wean and feed those calves for 90 days is the economic return worth the risk?

If at the beginning of December the 440 lb. calves weigh 620 lb. after being on feed for 90 days and sell for \$2.00/lb. (\$1,240/head) was the endeavor worth it?

In the 2021 Beef Backgrounding Cost of Production updated annually by the Farm Management Team at Manitoba Agriculture and Rural Development, an Alfalfa Grass Hay and Rolled Barley ration costs approximately \$1.45/day or \$0.725/lb. of gain (\$130.50) with hay at five cents/lb. and Barley at \$4.40/bushel. Looking at estimated current hay prices at 10 cents/lb. and estimating barley at \$6/bushel those costs approach \$2.36/day or \$1.18/lb. of gain (\$212.40).

On the basis of feed cost alone for this type of ration, at current market prices, his 440 lb. calves would have had to be worth less than \$1,027.60 (2.36/lb.) at weaning to consider the post weaning feed program. This still has not accounted for yardage, fixed costs or death loss. Using a different ration or different calf sale prices could change the results, but you have to run your numbers to be certain.

Whether you choose to keep calves back for supplemental feeding this year is a decision that requires a hard look at your individual costs and long-term farm goals. No matter what you decide, there are some things to look at when presenting your cattle for sale to improve your potential returns.

- Proper castration and dehorning reduce price discounts at sale time.
- Grouping calves in uniform packages sorted by gender and weight for marketing may also improve potential returns.
- Managing shrink where possible; using video sales, pre-sort sales, show list sales or direct from farm marketing all can help to reduce shrink.
- Watch your cattle sell or set a floor or pass price for anything that gets singled out if you can't be there.
- Get to know a buyer or buyers. They can be good sources of information on markets, trends, and events affecting the beef sector outside your market area.

Watch for the 2022 Beef Backgrounding Cost of Production coming out later this fall. Visit www.manitoba.ca/agriculture/farm-management/production-economics/cost-of-production.html for more resources.

Strategic Culling - Options for Stretching Feed Supplies

During years of feed scarcity and rising feed costs, difficult decisions need to be made. When faced with these difficult decisions, putting a plan together or adjusting your current plan can help ease some of your stress. Strategize what you can do; which cows you think are not producing; can you wean your calves earlier? What is the best plan for your operation?

Strategic Culling

Culling cattle is a primary method of dealing with drought because it reduces the consumption of limited forage and feeds. When making culling decisions, it is important to analyze all the production phases of your operation including the calves, replacement heifers, cows and bulls.

The primary objective in culling cattle is to preserve body condition score (BCS >4 on the 9 point scale) in the herd with the lowest input costs possible. Overstocking pastures in drought years can result in pasture degradation and lengthening the recovery period after the drought has passed. A timely reduction in the herd numbers should reduce the amount of supplemental feeding necessary to maintain the BCS of the remaining cattle in the herd.

Culling Considerations

Early Weaning - The first consideration in culling should be weaning calves. Lactation significantly increases the cow's energy and protein requirements. Dry cows have a much lower energy requirement which can reduce the supplementation costs. Weaning calves early can improve a cow's BCS, increase the subsequent pregnancy rate, reduce the postpartum interval and



reduce feed consumption. All of these have a long term economic impact. Calves are typically weaned 30 to 90 days earlier than normal.

Before you decide to early wean your calves, here are a few things you need to consider:

- Once weaned will the calves be sold directly, backgrounded or retained for feeding and finishing?
- Do you have good quality feed to keep the calves and meet their nutritional requirements?
- Calves should be processed 10 to 14 days prior to weaning - castrated, dehorned and vaccinated.
- Offer creep feed to calves before weaning as this will help them adapt to calf ration once they are weaned.

Thin cows should be culled right away in drought conditions. Cows that are thin in non-drought conditions likely have higher nutritional requirements during non-drought conditions as compared to their herd mates.

Keeping extra replacement heifers when forage supply is short is challenging. In drought conditions, pregnancy-checking heifers early is recommended; as early as 90 days after the bulls were turned out. This allows the quick culling of late-bred heifers, which helps narrow the breeding season the next year.

All open cows should also be culled as a first priority, since they will not contribute income to the operation. A cow that misses weaning even one calf will likely never recover the decrease in her net present value.

Cows that calve later in the calving season typically have lighter calves at weaning and are more likely to be open when exposed during an established breeding season

When BCS is kept high, cow age may not affect the reproductive performance, but age will reduce the ability of a cow to hold a high BCS. Feed intake and milk production of beef cows begin to decline at age 8. Older cow's teeth should be assessed, since teeth wear down with age or they may lose teeth. Mouthing during pregnancy testing is recommended. Those with poor teeth health should be culled as they have difficulty consuming forage especially when forage is in short supply.

Cows that experience calving problems or dystocia should be culled as they will also have a lower conception rate as compared to those who have not had any issues.

Soundness - any cows with lameness, bad eyes, or poor udders should be culled as should ornery cattle or those who have temperament issues. This may also include those who are fence climbers or show poor mothering ability.

Bulls can consume 25 per cent more forage than cows. During drought conditions the management of your bulls is worth extra consideration. Semen checking within a month of the end of breeding season can help determine if any of your bulls should be culled, which can save on feed.

Options for Extending the Grazing Season

Extended grazing allows livestock to return most of the nutrients they consume directly to the landscape where they are fed. Feed costs can be less but yardage and feeding costs are lower as are manure removal costs. Manure and feed residues contain valuable nutrients that become available to annual or perennial crops. This improves crop productivity and quality, and can extend the grazing season. Extended grazing options can vary from using crop residues to corn, swath, bale or stockpiled perennial forage grazing. Feeding management needs to be flexible to allow for some supplementation or complete feeding in extreme conditions.

Perennial forage that is grazed or cut early in the season, with regrowth saved for late-season to early spring grazing, is referred to as stockpiled forage. The first or second cut is harvested as hay and re-growth is grazed after or close to killing frost. Grass and legume mixtures are better suited than pure grass and legume stands for decreased risk of bloat and grasses retain their leaves better.

Alfalfa and grass can be grazed moderately in the fall close to or after a killing frost with minimal impact on the winter survival of the alfalfa. Second cut alfalfa harvested in mid-October averages 15 to 17 per cent protein and 64 to 66 per cent TDN (energy). A dry cow in mid gestation requires TDN in the mid 50s and 7 to 8 per cent protein, while a lactating cow requires TDN in the low 60s and 10 to 11 per cent protein.

Annuals for fall grazing or swath grazing

Annual crops can be swathed in late summer to early fall, and grazed immediately or left until after freeze up. Most annual cereals should be cut at the early to mid-dough stage for highest quality and yield. Control access to the swaths by strip grazing using portable electric fence to reduce the risk of grain overload and ensure higher utilization. Swath grazing during wet falls should be done after freeze up to improve utilization and to decrease waste. Stubble grazing can utilize uncropped areas, straw aftermath and volunteer re-growth that is high quality. An annual crop producing two to three ton dry matter/acre will produce 113 to 168 cow grazing days/acre for a 1300 lb. cow assuming 20 per cent waste or residue.

Grazing standing corn produced 305 cow grazing days per acre (1300 lb. cow) at the Manitoba Beef and Forage Initiatives Brookdale site from 2016 to 2020. The average yield was 5.4 ton of dry matter per acre, the protein was 7.3 per cent protein and the TDN was 73.4 per cent. For either corn or bale grazing, moving cattle every three to four days using electric fencing minimizes waste and required labour. Feeding forages prior to moving the cattle to fresh corn will help prevent grain overload as the cattle won't be as hungry. Plus tame forages (alfalfa and grass) will boost the protein in the ration and encourage the cattle to clean up the stover better.

Bale grazing can involve all the bales being placed in the fall or hauled every seven to 10 days during the winter. If the bales are all placed in the fall, electric cross fencing helps to control feeding and minimizes waste. Another option is to place the bales in existing paddocks and move the cattle between paddocks according to how long the feed lasts. Bales should be spaced 30 to 40 feet apart to allow adequate access for the feeding animals and to keep nutrient importing at a moderate level. A bale spacing of 33 feet apart equates to 40 bales per acre. Portable wind breaks provide movable, affordable on-pasture shelter but may not be adequate in extreme winter conditions with high wind chill. Since snow is a good insulator a powerful electric fencer is necessary for optimal livestock control. Using multiple wires including a ground on the cross fence maybe required.

Feed contains valuable nutrients

When producers bale graze, unroll bales, shred bales or feed in rings, nutrients are being added to the land from the feed being fed. Livestock only capture a small per cent of these nutrients (10 to 20 per cent) so most of the nutrients are returned to the land. If 30 bales are fed per acre and the animal utilizes 20 per cent of the nutrients, 570 lb. of N, 51 lb. of P (117 lb. P2O5) and 434 lb. of K is returned to the land.

Grazing stockpiled forage in the fall is one of the most economical methods of extended grazing (fencing and standing forage cost included). Over the last two years at MBFI, grazing the second cut was the most economical method of extended grazing at \$1.05/cow/day, (\$1 in 2019) followed by corn at \$1.68 (\$1.63), swath at \$2.18 (\$2.71) and bale at \$2.71 (\$3.16). This includes yardage, labor and supplemented feed. This compares to Manitoba agriculture's average traditional feeding cost of \$3.57/cow in 2020/21 and \$4.23 the year earlier.

By extending the grazing season instead of confining animals and using stored feed, you can significantly lower winter feeding costs. Some extended grazing options can cut your feed costs, but not always. Extended grazing returns nutrients back to the land, it reduces manure disposal costs and it cuts winter feeding and yardage costs. That makes extended grazing a practice worth considering.



Manitoba Farm, Rural and Northern Support Services

Agriculture is more than a business. It is a way of life and it is made up of people. Farmers and ranchers are deeply committed to the land, their animals, their families, and their rural communities. At the same time, farming and ranching can be one of the world's most dangerous, risky and stressful occupations. The Manitoba Farm, Rural and Northern Support Services understands how hard it is to make sensitive and difficult decisions in your business during this extreme drought. Counsellors offer free, confidential and non-judgmental support for anyone who lives on a Manitoba farm, rural or northern community. Call their telephone help line toll free at **1-866-367-3276**, Monday to Friday from 10 a.m. to 9 p.m. After hours call toll free 1-888-322-3019.

If you would like to be added to our information-sharing list, please email or text Juanita Kopp Juanita.Kopp@gov.mb.ca, 204-825-4302. Your input or topic ideas are always welcome.

Contact us

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