Virtual Beef

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In This Issue

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Direct general questions and suggestions to: Megan Van Schaik, Editor at Megan.VanSchaik@ontario.ca or call 519-826-5106. For inquiries regarding content of a specific article contact the author.

Bale Grazing Beef Cows

Barry Potter, Agriculture Development Advisor, OMAFRA, New Liskeard

Feeding cows is expensive, time consuming, and challenging in poor weather. Keeping cows grazing longer in the fall reduces the amount of stored feed required for a beef cow in the winter. Stock piling grass for late season usage can keep cows on pasture until the snow gets deep. Many producers are now following the grazing season with a technique known as bale grazing.

This practice involves setting dry hay bales out across a pasture or hay field in the fall when the weather is good and the sod is firm. The bales are usually set out in rows or diamond shaped patterns with approximately 40 ft between the bales. Doing this usually will provide 25 bales/acre. Strings are removed from the bales. Generally bales are set on their side, rather than their end as this reduces wastage.

Management of grazing bales can be intensive or extensive. Generally, most farmers have tried intensive or using electric fence to restrict access to bales. This helps cows clean up all the hay in one section before moving on to more bales. Typically cows are given about 4 days of grazing in a parcel of pasture.

Some farms have tried leaving the bales in the field after baling (less intense as fewer bales/acre) and having the cows graze them over a larger area.

Some of the questions people have about bale grazing include:

- How much feed wastage is associated with this practice?
- Is there any damage to fields the next year?
- Is manure evenly distributed?

An applied research organization called Lakeland Agriculture Research Association (LARA) based in Alberta looked at some of these questions.

Feed Wastage:

To some, putting bales out in the field and letting cows eat and tramp in them seems to “waste a lot of feed”. To determine how much wastage, LARA measured the amount of feed left behind by the cows (see Table 1). Wastage was measured on the same farm using the same cow herd for five winters. Each fall tarp was placed in the field with a flag in the centre of the tarp. After snow fall, bales were weighed and put on top of the flags. The cows grazed the bales in the winter. In the spring, residue was collected, the manure was sorted out, and the amount of hay left was weighed. Feed wastage varied between 7%-19%. Weather and the amount of snow had an impact on the amount of wastage. The average amount of wastage over the course of the trial was just under 16%. This compares to other studies from Alberta Agriculture showing waste of about 19% with this feeding practice.

Table 1: Feed Wastage

Year	Bale Type	Orientation	Estimated % Waste	% Manure in Residue	Initial Quality		Waste Quality	
					CP (%)	TDN (%)	CP (%)	TDN (%)
2008	Fescue/Alfalfa	end	17.69	15.76	13.86	58.33	7.65	43.43
	Reed Canary	end	19.11	12.48	9.96	53.37	4.91	44.26
2009	Fescue/Alfalfa	side	9.96	20.24	14.49	58.89	9.57	45.49
		end	13.48	18.82				
2010	Fescue/Alfalfa	side	7.27*	34.96	10.69	54.72	7.42	41.85
		end	16.59	32.69				
2011	Fescue/Alfalfa	side	7.12[b]	20.02				
		end	16.08[a]	21.85				
Average:	Fescue/Alfalfa	side	8.54	20.13	13.01	57.31	8.21	43.59
		end	15.96	22.28				

*Low number of data points, excluded from averages.

In a Greener Pastures grazing workshop this year, Steve Kenyon indicated that this “wasted hay” contains valuable nutrients to help build the soil. He estimates that every day of bale grazing adds 30 cents of fertilizer value to the field.

Work by Agriculture and Agri-Food Canada determined that for every 1000 lbs of hay fed in a field, there is about 30 lbs of nitrogen, and 5 lbs of phosphorus left to improve fertility. Plus the organic matter and manure distribution increases soil fertility even more.

Research at the University of Saskatchewan compared bale grazing nutrient retention versus spreading manure. It shows that in-field feeding allowed 30%-45% recovery of added N and 21%-32% recovery of added P while spreading manure allowed only 5%-9% recovery of added N and 3%-5% recovery of added P.

Does bale grazing work for you? A calculator, linked from foragebeef.ca, called the Bale Grazing Calculator, helps answer that question.
http://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/agricultural-programs-and-services/information-services-for-agribusiness-farmers-and-ranchers/farming-and-agricultural-calculators.

Yield Benefit:
The work at LARA shows that bale grazing improves the yield on hay land in subsequent years. Data collected showed yield increases of 30%-50% in subsequent years. Influencing factors include increased fertility, retained moisture and improved organic matter.

People who have bale grazed talk anecdotally about dark rings of growth around where the bales have been fed, with increased volume evident.

Figure 1: Bale grazing spring rings.

Why bale grazing is an effective tool:

- Bale grazing can reduce feed costs. By storing bales close to the pasture area, and putting them out on the field at one time, labour and machinery costs can be reduced significantly.
- Manure is distributed across fields as the cows eat. There is a fairly even distribution pattern. You don't have the cost of spreading manure from yards.
- Low fertility areas of a field or pasture can be increased through bale grazing. The "wasted feed" adds nutrients, and the manure gets applied to areas that may not get manure.
- Cows get effective exercise, which has been shown to be important in keeping muscle tone on cows for calving.

Bale grazing challenges:

- Wet conditions can see the cows pug up the soil.
- Too much snow can make cow movement between bales difficult and increase feed wastage.
- Older cows and heifers can lose body condition due to a colder, more exposed environment.

Other considerations:

- Twine should be removed. Sisal does not break down fast enough over winter.
- Foragebeef.ca recommends using a maximum density of about 800 cow days/acre which, depending on bale weight, works out to about 25 bales/acre. Monitor the following summer's vegetation response to avoid excessive nutrient loading to determine when to return to this feeding site.
- Leaving cows in one area for longer periods of time will increase nutrient load and feed wastage.
- Cows need wind breaks. Consider having portable windbreaks for the cows to reduce exposure and the resulting loss in body condition score.
- Water availability can be an issue, especially if there is a lack of good quality snow for licking by the cows to satisfy moisture needs.

Bale grazing has been shown to reduce feed costs, improve soil fertility, and allow cows to live in a healthy environment.

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Barry Potter, Agriculture Development Advisor
Ontario Ministry of Agriculture, Food and Rural Affairs
barry.potter@ontario.ca

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A Tribute to Tom Hamilton

Ray Ford, Ontario Farmer

Friends, colleagues, and northern cattlemen are paying tribute to Tom Hamilton, the longtime OMAFRA beef researcher who died unexpectedly last Feb. 6 at the age of 58.

With his dry humour and professorial demeanour, Hamilton has been a fixture in New Liskeard-based cattle research for decades. He initially trained as a wildlife biologist before shifting to work with cattle. As a farm researcher, he looked for ways to work with – rather than against – the animal's natural instincts.

The result was a range of projects including studies of calving on pasture versus winter calving in barns; extending the grazing season; efficiently wintering cattle; and improving reproductive efficiency.

Hamilton delivered the information with his trademark humour. When a lousy hay season led to too many “poor doers” at calving time, Hamilton authored a factsheet on “Newborn Calf Jeopardy:”
Question: “This high-fibre substance links the summer of 2008 with poor-doing newborn calves in 2009. “
Answer: “If you answered ‘What is poor hay quality?’ you are probably one of many Ontario beef farmers having a frustrating calving season (and give yourself 100 points)”.

Behind the fun was a generous colleague with a first-class mind, says OMAFRA Agriculture Development Advisor and longtime friend Barry Potter. “Tom was brilliant,” Potter says. Whether it was a technical issue or a complex theoretical glitch in a research trial, “he could really solve problems.”

Hamilton “always had an entertaining way of getting the information across,” said Beef Farmers of Ontario president and Temiskaming cattleman Matt Bowman, adding he was “shocked and saddened” to hear of Hamilton’s passing.

A native of Kirkland Lake, Hamilton retired from OMAFRA last November after 30 years of service. Outside of the office, he was an avid outdoorsman, canoeist and cottager. He is survived by his wife, Patricia, and his children, William and Kristen. Memorial donations are directed to the Temiskaming Hospital.

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Ray Ford, Ontario Farmer

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Combating Heat Stress in the Summer Months

Megan Van Schaik, Beef Cattle Specialist, OMAFRA, Guelph

As we gear up for summer, it’s time to be thinking about the challenges a new season brings. One of the challenges of the hot and humid days of summer is heat stress. Heat stress can negatively impact both animal productivity and welfare. Monitoring weather forecasts in the summer and being aware of the risk factors, signs, consequences, and mitigation strategies for heat stress can help to minimize its effects.

Why is heat stress a problem?
Heat stress has a negative effect on animal performance and welfare. It has been associated with several issues including reduced feed intake and gain in feeder cattle and decreased fertility in breeding animals. Severe and prolonged periods of heat stress can lead to mortality.

What are the risk factors?
To maintain temperature homeostasis, animals will produce and dissipate heat. Cattle produce a substantial amount of heat from digestion (fermentation) and also generate heat from tissue metabolism. The means by which cattle dissipate heat include convection, conduction, radiation, and evaporation (sweating and respiration). When cattle are unable to transfer heat to the environment due to environmental conditions, heat stress can set in.

High ambient air temperature is the main culprit of heat stress, however elevated temperatures coupled with high relative humidity, solar radiation, and reduced air movement can further predispose cattle to heat stress. A Temperature Humidity Index (*Table 1*) accounts for both temperature and relative humidity and can be used to determine approximately when cattle will begin to experience heat stress and the severity of heat stress endured.

Table 1 – Temperature Humidity Index (THI) for Livestock*

Ambient Air Temp	Relative Humidity (%)					
°C	20	30	40	50	60	70
37.8	26	29	30	31	33	34
36.7	26	28	29	31	32	33
35.6	26	27	28	30	31	32
34.4	26	27	28	29	31	32
33.3	25	26	27	28	29	30
32.2	25	26	26	27	28	29
31.1	24	24	26	27	27	28
30	23	24	25	26	27	27
28.9	22	23	24	25	26	27
27.8	22	23	23	24	25	26
26.7	21	22	23	23	24	24
25.6	20	21	22	23	23	24
24.4	19	21	21	22	22	23
Livestock Safety Index (°C)	**Normal <23**		**Alert 24-25.5**	**Danger 26-28**		**Emergency >29**

*Adapted from Alberta Agriculture and Forestry "Minimizing Heat Stress in Beef Cattle"

The University of Guelph and the Ontario Ministry of Agriculture, Food and Rural Affairs have developed a heat stress app that can be used by livestock producers to assess potential risk of heat stress. To download the app or for more information, visit www.omafra.gov.on.ca/english/engineer/facts/heat-app.htm.

The extent to which heat stress affects cattle depends on age, body condition, availability and management of feed and water, access to shade or shelter, and other physiological factors. Lower nighttime temperatures tend to reduce the impact of elevated daytime temperatures on cattle because there is opportunity for heat dissipation.

Feeder cattle tend to be at increased risk of heat stress when fed high-energy diets that result in increased metabolic heat production. Susceptibility to heat stress is particularly high for cattle close to finishing with increased body condition. Coat colour can also affect susceptibility to heat stress. Dark-haired cattle are more susceptible to heat stress than light-haired cattle.

What are the signs of heat stress?

Cattle will change their behaviour in attempt to adapt to temperatures outside of their thermoneutral zone. During periods of elevated temperatures, cattle will tend to seek shade, spend less time lying down, and will look for water sources to help them cool down.

When cattle are distressed due to the heat, they will exhibit symptoms that include:

- laboured breathing
- open-mouth panting
- bunching in attempt to reduce exposure to solar radiation
- increased saliva production (drooling)

What can be done to mitigate heat stress?

- Provide a sufficient volume of drinking water
    - Providing an ample amount of drinking water to cattle is a critical measure to reduce the effects of heat stress and to prevent dehydration. Keep in mind that water needs for cattle increase as the temperature rises. *Table 2* outlines the water requirements of cattle at different stages of production and at various ambient temperatures.
    - Ensure adequate drinking space is available. Consider that more visits and more time spent at waterers can be expected during periods of hot temperatures.
- Alter the feeding regime
    - Under normal circumstances it is a good practice to keep the feeding regime consistent. However, altering feeding practices during a heat wave can be a means of reducing the effects of heat stress.
    - For feeder cattle experiencing heat stress, Mader et al. (2002) showed that restricted feeding methods helped to reduce the effects of heat stress versus offering feed ad libitum.
    - Feeding the bulk of the diet late in the afternoon or in the evening can help minimize the effects of heat stress. The objective behind this strategy is to stagger peak daytime temperatures and rumination to reduce heat load (Davis et al., 2003).
- Consider physical accommodations
    - For confined cattle, increase airflow by opening up curtains and allowing as much airflow through the barn as possible. Use fans to increase air movement.
    - Wetting down cattle and surfaces can be an effective means of reducing heat stress. Davis et al. (2003) showed that sprinklers were effective in mitigating the effects of heat stress through increased transfer of heat by evaporation. Sprinkling also cools barn surfaces which can increase heat transfer between animals and surfaces. Care must be taken in budgeting for adequate water supply and ensuring floors do not become slippery.
    - Provide shade (such as trees, buildings, other shading structures) where possible and ensure there is adequate space for cattle to spread out.
- Modify handling strategies
    - Avoid shipping, processing, and any kind of handling of cattle at peak temperatures during the day. Body temperature increases with increased activity, therefore restricting animal handling to early morning or evening can help to reduce heat load.

Table 2: Approximate Total Daily Water Intake of Beef Cattle in Litres*

Cattle Class	Weight		Air Temperature in °C					
	kg	lb	to 4°C	10°C	14°C	21°C	27°C	32°C
Growing Cattle	185	400	15	16	19	22	25	36
	273	600	20	22	25	30	34	48
	364	800	23	26	30	35	40	57
Finishing Cattle	273	600	23	25	28	33	38	54
	364	800	28	30	34	41	47	66
	454	1,000	33	36	41	48	55	78
Lactating Cows	409+	900+	43	48	55	64	68	61
Mature Bulls	636	1,400	30	33	38	44	51	72
	727	1,600	33	36	41	48	55	78

*Adapted from: Nutrient Requirements of Beef Cattle: Eighth Revised Edition: 2016, National Research Council

In summary, heat stress can reduce cattle performance and welfare. Having a plan to mitigate heat stress prior to the hot and humid summer months can help you respond to periods of elevated temperatures when they occur.

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Megan Van Schaik, Beef Cattle Specialist
Ontario Ministry of Agriculture, Food and Rural Affairs
megan.vanschaik@ontario.ca

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Did you hear?
We've made great improvements to the Agricultural Information Atlas!

We're excited to let you know about the latest updates that we made to the Agricultural Information Atlas (AIA). What is the AIA? It's the Ministry of Agriculture, Food and Rural Affairs' (OMAFRA) free, easy-to-use online tool that can help you to:

- Develop nutrient management strategies and plans
- Plan tile drainage for your farm
- Develop a farm sketch for Pest Assessment Reports and Bee Yard Registration and other government programs, including the Great Lakes Agricultural Stewardship Initiative (GLASI)

So, what are the changes?
The AIA is now housed on a new platform. If you are a current user of the AIA, you'll need to update your bookmarks to the new URL so you can find the AIA quickly and easily. Better yet, the AIA is now mobile-friendly. Open it up on your phone or tablet for quick access while you're in the field or on the go.

Our updates include new features and tools, such as:

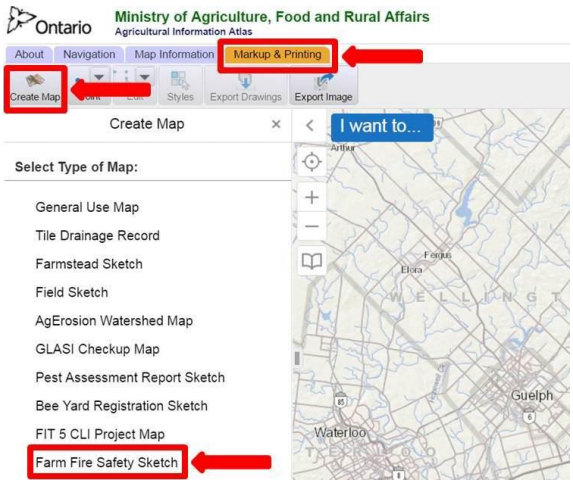
- The ability to add your own user data, such as GPS points or shape files
- Auto-population of 911 addresses
- The removal of the "Label Map" function, and an added "export markup" function (i.e. text and graphics) that allows you to save and bring data back in again at another time
- Right-clicking on the map will give you quick and easy access to GPS co-ordinates, basic markup tools and other functions
- 2015 southwestern Ontario imagery data

We've also added a Farm Fire Safety Sketch template in the "Create Map" section. You can use the template to develop a sketch of your farm showing features like fire risk areas, utility shut-off points, water sources, livestock barns and access

routes for emergency vehicles. This sketch can be shared with local first responders to have on-hand in case of a fire or another emergency. Visit the Farm Fire and Emergency Sketch web page for help with making a sketch for your operation.

Most of the changes we made were based on user feedback. Let us know what you think about the updates and new features at omafra.gis@ontario.ca so that we can continue to improve the AIA.

Need help with the AIA? Our Help page answers some common questions. You can also contact the Agricultural Information Contact Centre at 1-877-424-1300 or ag.info.omafra@ontario.ca.
ontario.ca/agmaps



The Farm Fire Safety Sketch template and other new tools are now available in the Agricultural Information Atlas.

Ontario Cow-Calf 2017 Production Survey