

OMAFRA Virtual Beef

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Forage Outlook and Feeding Strategies for Fall 2012

Christoph Wand, Beef and Sheep Nutritionist
Ontario Ministry of Agriculture, Food and Rural Affairs

Forage Shortage on Many Minds

With the unusual nature of spring 2012, the continued decline in forage acreage, and current dry conditions in parts of the province, there are already reports (as of mid-June) that hay prices are extremely high at present, and that this may foreshadow the hay and forage market for fall of 2012. Finding a successful stored forage strategy will depend on a few things:

- Factors that will impact short-term forage supply and demand
- Management ideas for hay-based cow herds
- Alternative strategies for feedlots and other TMR-fed beef operations
- Longer-term forage outlook

Factors in a Potential Forage Shortage

The story of 2012 Ontario forage supplies is still very uncertain, and will continue to be until 2nd and maybe even 3rd cut hay and haylage is put into storage. Until that time, we will not really know the extent to which a supply crunch will or will not occur due to the dry conditions and the continued decline in Ontario forage acres, as depicted in Figure 1. Census data indicates that forage acres in Ontario continue to decline, a situation related to the appeal of commodity cash crops. One factor which may affect the demand side is the potential for the horse sector to shrink, as indicated by the intentions of many horse breeders to reduce their holdings and breedings. This would cause a loss in the associated hay demand. So, although the initial perspective that total yield will be down

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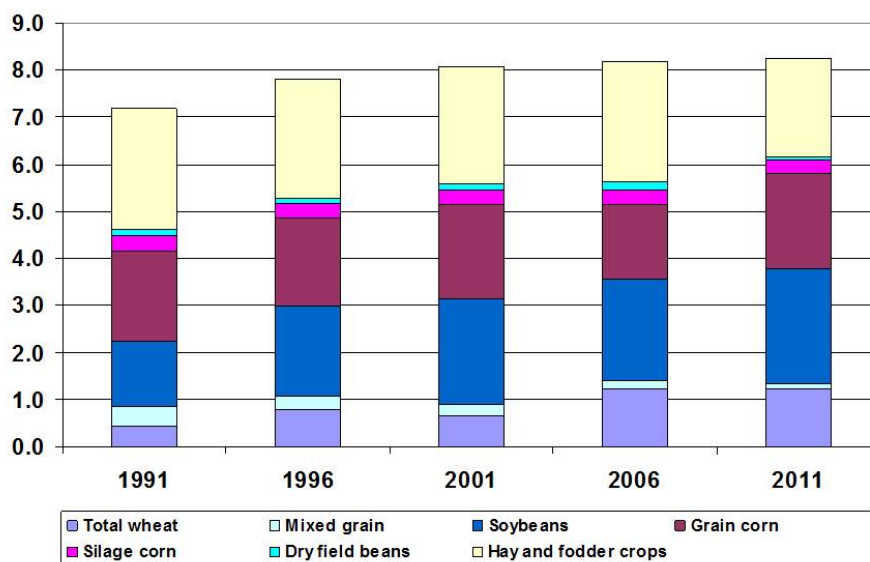


Figure 1. Area of Field Crops in Ontario by Year

Table 1 gives nutrient parameters for common forages and some other feeds, on a dry matter basis. The term eNDF (effective neutral detergent fibre) is a measure of how well a feed stimulates rumination. Paying attention to the percent of total NDF which is made up of eNDF may become important to the beef sector (as it has in the dairy sector), as alternative forage sources are investigated.

	% TDN	% CP	% NDF	% eNDF
Alfalfa Hay – early bloom	62	19.9	39.3	92
Alfalfa Silage – early bloom	63	19.5	43.0	82
Orchardgrass Hay – early bloom	65	12.8	59.6	98
Orchardgrass Hay – late bloom	54	8.4	65.0	98
Corn Silage – 45% grain	72	8.7	43.0	81
High Moisture Corn ¹	93	10	9	0
Corn and Cob Meal ¹	82	9.0	26.0	56
Corn Stalklage	55	6.3	68.0	81
Wheat Silage - dough	57	12.5	60.7	61
Wheat Straw	41	3.5	78.9	98
Barley Straw	40	4.4	72.5	100
Soybean Straw ¹	42	5.0	70.0	100

* From Nutrient Requirements of Beef Cattle, 7th Revised Edition 1996, Appendix Table 1A, except those denoted as ¹ which are from the Nutrient Requirements of Small Ruminants, 2007, Table 15-11.

due to changeover of forage acres to cash crop, causing higher forage prices, the effect of equine demand change may moderate it.

Cow Herd Wintering Strategies

In the event of a stored forage shortage, here are a number of strategies that could be implemented to substitute or stretch forage resources:

1. **Substitute other straws, stovers and residues for hay.** Table 1 ranks some common alternative forages for a number of nutrients, including digestibility and crude protein levels. The extent to which this substitution can be used is a function of the straw quality and the cow's age of production.
2. **Institute limit feeding.** Several sources suggest that limit feeding can reduce wastage, and reduce luxury consumption of feed without affecting performance. This is because the cow herself is a natural buffer who can increase or decrease resource usage by altering body fat stores, liver wastage and waste heat production.
3. **Implement ionophore use.** Including ionophores at higher levels than used as a coccidiostat can reduce feed usage as well. By making rumen fermentation more efficient, the cow can harvest more feed energy as metabolites for her system, rather than have that feed energy blown off as methane.

4. **Reduced hay rations + commodities.** By using commodities to offset hay, hay can be saved. There are a number of ways this can be done using limit feeding, in a TMR, or just to offset a poor quality residue feed like straw. Each of these approaches is based on the concept that commodities are concentrate feeds and can replace more nutrients per unit weight than hay. For example, corn can replace up to twice the amount of hay per unit weight, as shown in Figure 2. Based on an approximate 2 to 1 replacement of hay with corn, a reduced hay ration can be fed to cows, provided some forage remains in the ration. The graph in Figure 2 gives some guidelines for decision making based on various price levels of hay vs. corn.

5. **Use corn silage.** One interesting development in recent years is that corn silage has actually become *cheaper* than hay in many areas. In this case, corn silage could be *maximized* in the ration, and then this ration would use low quality forages to bulk them, a protein supplement to address the protein shortfall, and then all of this delivered on a limit-fed basis.

Feedlot Strategies

Many feedlot rations use processed hay in rations to ensure rumen health, providing the "scratch factor". To replace that functionality, the following (many of which will seem a lot like the cow list) should be considered:

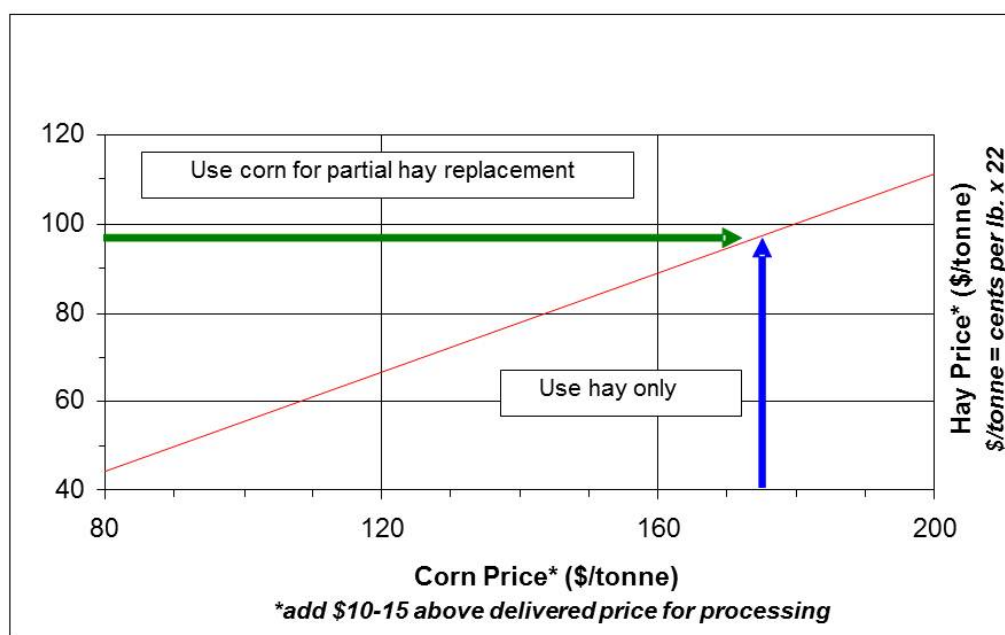


Figure 2. Cost Breakpoint for Corn/Hay substitution

Considerations for Cash

Nancy Noecker, Beef Cow Calf Specialist
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The cattle market is certainly at record levels, and anyone with calves to market this fall will be looking forward to a good return on their calves. However, just because the returns are looking good is no reason to give up any extra value you can still generate between now and the calf sale! Gain will translate into more dollars returned.

Back to Basics: are the calves **castrated** and **dehorned**? Not doing this will discount your calves 5-10 cents versus equivalent quality steers. If not done already, make sure the work is done at least a month - preferably two - ahead of sale. This is so all healing is complete and the calves have a chance to make back some of that compensatory gain from the weight loss due to stress. Research shows that some of the greatest pain in banded cattle comes 3-4 weeks following the castration. If you are processing the calves when they are older, talk to your veterinarian about using pain medication at the time of surgery and pain control during healing. Again, new research is starting to show that all along the chain, if pain is controlled the cattle will eat more and thus gain more or ... less pain = more gain.

A Vaccination Program –What do your buyers and/or calf sales want or require? If they say three weeks prior to sale, then they mean 21 days prior to sale not “well 16 days is close...” Put yourself in the buyers’ shoes of paying \$800-\$1000+ for a calf. You would want the calf vaccinated correctly and have a lot less chance of it getting sick or dying. Also, give the vaccinations when the calves are under as little stress as possible and are on a high plane of nutrition, so they will have every opportunity to mount a good immune response.

Creep Feeding Increases Gain

With calf prices predicted anywhere from \$1.50/lb and up, then it makes sense that weight put on through creep feeding will have a positive return as long as the cost of gain is below the \$1.50/lb. Remember you are trying to put on lbs of muscle not fat on the calf, and you are not trying to change the rumen over to a grain diet. The creep diets should be high in protein, not starch, and may be limit fed. For more information see OMAFRA Factsheet Creep Feeding Beef Calves Agdex # 420/50
<http://www.omafra.gov.on.ca/english/livestock/beef/facts/02-027.htm>.

1. **Substitute other straws, stovers and residues for hay.** Again, see Table 1 for forage information, and perhaps this time consider the *effective fibre* the way a dairy producer might. Again, the extent to which this can be done is a function of the straw quality, and the stage of finishing.
2. **Switch from High Moisture Corn (HMC) to cob meal.** As seen in Table 1, the effective fibre contribution of cob meal to rumen function and health is much greater than for regular high moisture corn.
3. **Use corn silage.** Again, in many places corn silage may actually be the cheapest forage. If 5% hay is used in the ration (or about 1 lb. per head per day), another way to achieve similar effective fibre is using long chop processing with corn silage at two times or more the hay inclusion rate. By long chop and processed, we mean using corn silage the way our dairy counterparts do, to improve rumen function. Worried about too much corn silage? There is a good body of research by Phil McEwen at Ridgetown College that shows corn silage levels of up to 50% of ration dry matter don't negatively affect performance, and often improve ration cost-effectiveness.
4. **Institute limit feeding.** Using this concept - also referred to as slick bunk management or target feeding – reduces luxury consumption in the finishing animal as well. The liver and gut tissues waste large amounts of energy, so feeding at 90 to 95% of ad lib (free choice) intake with slightly higher protein levels results in the same performance by making these organs run a little ‘leaner’. So if hay is 5 or 10% of the ration, if we reduce intake by 10% we can reduce total hay usage by 10% as well.

Long Term Outlook

Forage shortages are not unique to Ontario. Other parts of the globe have been driven to alternative forage strategies for all sorts of reasons, including the rising cost of irrigation. That means our worldwide understanding of using alternative fibre sources in everything from beef to dairy rations is improving. So, even if hay remains expensive we will find ways to adapt. So, don't despair about the industry's future with the short-term rise in hay prices; either the marketplace will change or the industry's outlook on fibre will!

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Figure 1. Fenceline weaning reduces stress on calves and cows.



Figure 3. Low stress 2-stage weaning with nose flaps.

Any number of feedstuffs can be used. Distillers' grains are gaining in popularity - they have high protein content and are very palatable. Talk to your feed mill about products they might have available. If you are considering creep feeders you need to think about placement and behaviour to get the most consumption and gain out of your calves (Figure 1). Creep grazing may be another option. For this, you set up a creep gate that allows the calves to graze ahead and skim off the best of the pasture, followed up by the full herd.

Weaning On The Farm ... can be easy and profitable or you can ruin the calf. It doesn't mean you rip the calf away from the cow, shove it in a dark, airless barn and put it on a full feed of grain. That behaviour is what has given cow calf producers a bad rap regarding weaning.



Figure 2. Low stress fenceline weaning

With either of the lower stress weaning methods (fenceline weaning or two-step weaning, Figures. 2 and 3) the calves stay clean, healthy and gaining <http://www.omafra.gov.on.ca/english/livestock/beef/facts/nostag.htm>. As an added bonus pre-weaned calves don't get sick and need as much treatment as bawling calves, even vaccinated ones. So with a little planning for good pastures and calves started on creep feed prior to weaning, you will have an opportunity to make use of those good gain genetics you have been breeding into the calves. However, you need to allow at least one month from weaning to the sale date. If you are going to try and do it with less time - don't. It will cost you money.

Implanting

One of our oldest "new technologies" implanting, still works and still pays back. A conservative \$10:1 payback might as well be in your pocket (double that if you believe the advertising). Unless you are selling calves into a "natural" market (in which case you should be asking for a premium) the first thing that will happen to your calf in the feedlot will be an implant. Thus you might as well have the extra gain for the last 100 days before the calf sale.

Trucking and Shrink

Experience does matter. Transportation work done by Dr. Karen Schwartzkopf-Genswein at Lethbridge indicated that experienced livestock truckers (six years or more experience) had loads with less shrink than less experienced drivers. The experienced drivers also had fewer problems with compromised or lame cattle. However, it is your responsibility to have a loading ramp in good repair that makes loading easy, and facilities that allow for easy flow of calves onto the truck. Every hour of chasing calves around getting them loaded are simply more lbs lost through shrink. This is another place where the

weaned calves shine. Once loaded and delivered to the facility they drink, eat hay if it is presented, then lie down and chew their cud, and not pace around bawling and continuing to shrink.

Acclimatize Your Calves For Sale.

You know that at the sales barn they will be unloaded and moved through a number of alleys and pens by people on foot. Why not get your calves used to this before they get to the sales barn (Figure. 4)? Nothing is as scary the 2nd or 3rd time through it. Use the chance when you are vaccinating or moving cattle to another pasture to confine them in the corrals or alleys and walk through them calmly. Add some noise if you can-the sales barn will be noisy. Let them out when they are quiet and then reward the cattle with grain or mineral and salt. The idea is for them to consider human interaction pleasant. Time spent this summer and fall may reward you with less shrink at the sale, which means more lbs to sell.



Figure 4. Acclimatize calves to people moving through them prior to sale.

To discuss or get more information on any of these suggestions contact members of OMAFRA's Beef Team through the Contact Centre at 1-877-424-1300, or <http://www.omafra.gov.on.ca/english/livestock/directory/staffdirectory.htm>.

Consider the things you can still change, for this fall's calf sales and cash returns!

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Extending the Grazing Season with Stockpile Grazing

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With increasing fuel and production costs, more economical and yet still viable alternatives are playing a larger role in conventional agriculture. Pasture has long been accepted as a source of forage during the summer months, however with proper management, stockpiled pasture can be a practical and inexpensive source of quality forage throughout the fall and winter months.

Stockpiling pasture is the process of allowing the forage in a field or paddock to accumulate until the growing has either slowed significantly or stopped altogether. This stockpiled forage is then available for grazing throughout the colder fall and winter until there is permanent snow cover. Stockpile grazing is chosen primarily for the reduced feed and feeding costs. Animals which are on pasture later in the season also spread their own manure back onto the pasture, further saving the farmer the cost of hauling and spreading manure over the area.

Proper management is the key to successful stockpile grazing. The quality and/or yield of the stockpiled forages can be controlled in much the same manner as first cut hay. The initiation date, which is the date at which the pasture is allowed to start to grow and accumulate for the cold months, is exceedingly important. An earlier initiation date (mid-July) can provide a higher yield and somewhat lower quality, while allowing summer grazing to proceed for a longer period and pushing back the initiation date to mid-late August will result in a loss in yield but a gain in quality. The decision as to when to initiate the stockpiling will depend on various factors, such as the requirements of the livestock that will be grazing the forage, the date which the stockpiled area is required, and the amount of pasture that can be set aside for stockpiling purposes.

Stockpile grazing can also be incorporated into a rotational grazing system, however it is important to keep in mind that as the grazing season progresses, the winter progresses as well. It is beneficial to use the stockpiled pasture furthest away from the barns (or feeding area) first and move progressively closer. This is to ensure that in the event of an early winter storm, etc. the livestock will be closer to the feeding area and the supplemental feed (if necessary) will not have to be hauled quite as far.

The species selected for a successful stockpile grazing system are also important. In general, the types of forages that should be chosen are the narrow leafed grasses, as they seem to be the best for storing on the stem. Traditionally, species such as timothy, tall fescue and bluegrass have been chosen for stockpile grazing, however with proper management the range of stockpile forages can be extended to include annual grasses such as Sorghum-Sudan grass hybrids and even forage brassicas. Additional resources on pasture and stockpile grazing are available at the Ministry of Agriculture, Food and Rural Affairs at www.ontario.ca/livestock

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Ageing Beef More (or Less) Gracefully

Research reveals ageing affects cuts differently

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While consumers may value a wide range of attributes when deciding what type of beef to **buy**, they are united in what the most important quality is when they **eat** it - **tenderness!** My Grandfather, who was a butcher, passed down this quote to my Dad: “a tough steak is dear at any price”. My Dad added his own nugget of wisdom regarding beef quality: “if I need a steak knife to saw through the meat, I don’t want that steak”.

Retailers deal with the sharp end of the beef supply chain, and they know that tough beef hurts sales and long term customer relationships. One of the main methods of improving beef tenderness after slaughter is ageing – a time period when the carcass or sections of it are refrigerated to allow natural enzymatic breakdown of tough fibres within the muscle tissue.

The effect of the length of the ageing period has been extensively investigated, but most research has focused on the loin and rib-eye muscles. It had been assumed that all muscle cuts responded similarly to extended ageing, but some early research had shown that this is not necessarily true.

An experiment at the Agriculture and Agri-food Canada Lacombe Research Centre, reported by Juarez et al,

investigated the effect of extended ageing on six different sub-primal cuts¹. The meat was from a commercial abattoir and was shipped directly to the research station. Research staff sliced 1 inch thick steak retail cuts from the wholesale cuts which represented the various parts of the carcass (Table 1 and Figure 1). Samples were stored at either 1°C or 5°C to evaluate the effect of cooler temperature on tenderness and flavour. Samples were cooked and evaluated weekly, starting on arrival (0 days of ageing), and up to 56 days of ageing.

Retail Cut	Wholesale Cut
Striploin	Loin
Blade-eye	Chuck
Outside round	Outside round
Inside round	Inside round
Eye of round	Outside round
Chuck tender	Chuck

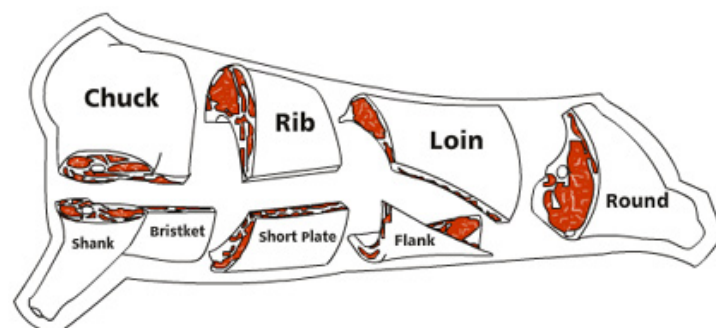
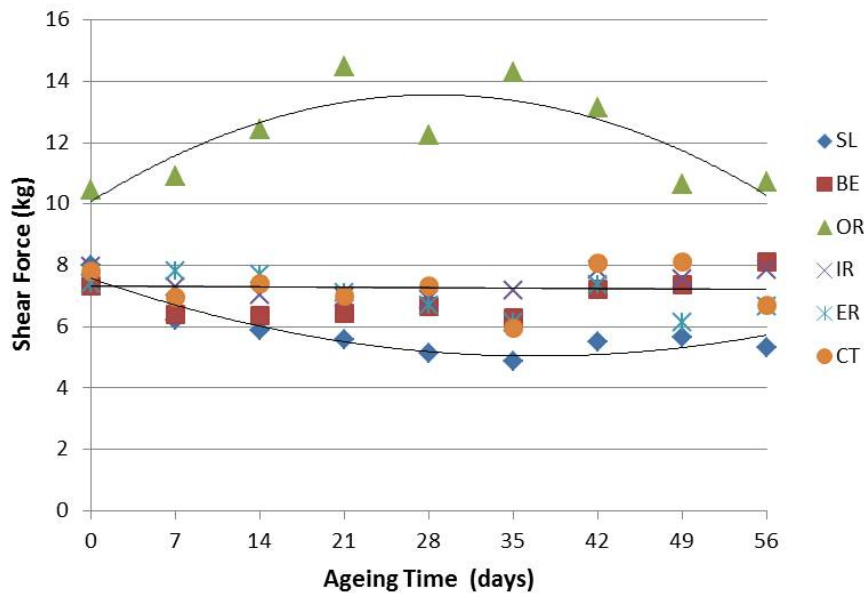


Figure 1. Sub-primal cuts of beef

After cooking, the samples were cooled and placed in a cooler at 1°C for 24 hrs, after which cores were taken and measured for the force required for a blade to shear across the meat fibres (Warner-Bratzler shear force). A higher shear force means that the meat would be tougher to chew.

Tenderness

Storage temperature did not affect shear force for any cut. However, ageing significantly **reduced shear force** for the **striploin, blade-eye, eye of round** and **chuck tender** (see Figure 2). Surprisingly, the **outside round** showed a significant **increase in shear force** over time, up to day 21, then trended downwards until day 49, when it was similar to day 0. In contrast to this, the shear force for the inside round did not change with ageing time. The reductions in shear force for the eye of round and chuck tender were not



SL = striploin; BE = blade-eye; OR = outside round; IR = inside round;
ER = eye of round; CT = chuck tender

Figure 2. Effect of Ageing on Tenderness

great, and did not reach values significantly lower than day 0 until day 35. Shear force decreased over time in a linear manner for striploin, blade-eye and eye of round up to day 35, after which values tended to stabilize. The chuck tender experienced a decline in shear force until day 35, with subsequent measures showing up and down trends.

Why didn't all of the cuts show increased tenderness over the ageing period? The authors propose that for muscles which initially showed increased tenderness with ageing, followed by a period of increased toughening, loss of moisture within the tissue could be one cause of the increase in toughness. Decreased moisture loss leads to increased cooking times, since heat transfer rate is reduced as water content decreases. Increased cooking time would lead to even more moisture loss and subsequent toughening of the meat. Another factor may be related to the collagen connective tissue in the meat. The presence of moisture helps to soften the connective tissue during cooking, so low levels would inhibit this softening effect. For cuts which undergo initial toughening, followed by increased tenderness, enzymes which become active only late in the ageing process may be the cause.

Sensory Evaluation

A trained sensory panel evaluated cooked steaks from each of the cuts at each of the ageing times. The panellists gave scores for initial tenderness (first bite), overall tenderness (after 25 chews) and for intensity of beef flavour and off flavour (10 -20 chews). Ageing increased initial tenderness scores for striploin and blade-eye, and overall tenderness scores for striploin, blade-eye and eye of round. Ageing decreased tenderness scores for outside round and inside round. No ageing effect was found for initial tenderness scores for outside round, inside round, eye of round and chuck tenders, and overall tenderness scores for chuck tender. In general, flavour intensity scores decreased as ageing time increased, while off flavour scores increased with ageing.

Discussion

These results show that the process of ageing is not uniform with increased time, and different sub-primal cuts showed dramatic differences in response to ageing. For example, ageing decreased the force needed to shear cores from striploins up to 35 days, after which additional ageing had no effect, while the outside round needed considerably more shear force with ageing up to 35 days, after which shear force decreased, becoming equivalent to the initial

value by day 49. In contrast, ageing did not affect the shear force for the inside round. Increased ageing resulted in an overall negative effect on the flavour of the meat.

While these findings are important for all players in the beef processing and retailing sectors, it is particularly relevant to branded beef value chains that have the ability to prescribe specific ageing and marketing strategies for different sub-primals. In concert with this, it is important to realize that increased ageing of some cuts is actually detrimental to quality, while for others increased ageing incurs storage costs without producing benefits.

Juarez, M., Larsen I.L., Gibson, L.L., Robertson, W.M., Dugan, M.E.R., Aldai, N. and Aalhus, J. 2010. **Extended ageing time and temperature effects on quality of sub-primal cuts of boxed beef.** Can. J. Anim. Sci. **90**: 361-370.

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Resources and Information

Alberta Agriculture announces the 4th the release of its Cowbytes stand - alone ration balancing program. Changes were needed to make the program Vista and Windows 7 compatible.

For more information go to: <http://www1.agric.gov.ab.ca/Sdepartment/deptdocs.nsf/all/agdex12486>

Managing Forage Supplies

www.omafra.gov.on.ca/english/livestock/beef/facts/chewingforage.htm

Dealing with Feed Shortages on Your Beef Farm

www.omafra.gov.on.ca/english/livestock/beef/facts/feedshort.htm

Dry Weather Information

Visit www.omafra.gov.on.ca/english/crops/weather/adverseweather.html for information on dealing with dry weather conditions.