Forage Focus Conference

The Ontario Forage Council will host the third annual Forage Focus Conference on

Tuesday, November 30
in Shakespeare

Thursday, December 2nd
in Winchester

Guest speaker for the conference series will be Dr. Bill Mahanna, with Pioneer Hi-Bred. As a Nutrition and Forage Specialist, Bill has a strong reputation as an entertaining speaker with the ability to translate high level knowledge into practical and usable terms.

Forage Focus Conference
Using Forages to Improve your Bottom Line
hosted by the Ontario Forage Council
November 30th in Shakespeare and December 2nd in Winchester
Keynote Speaker: **Dr. Bill Mahanna, Nutritional Specialist, Pioneer Hi-Bred**
See his article below.

In his current position as Global Nutritional Sciences Coordinator, Bill provides technical leadership in developing Pioneer's nutritional profiles for corn, alfalfa and forage and grain products that meet the needs of the livestock industry.

Dr. Ira Mandell, a beef researcher at the University of Guelph, will also speak on exciting findings in the desirable fatty acid content found in forage fed beef.

To Register: Call 1-877-892-8663
Deadline to Register: Nov 26th
Conference Cost: $30
(includes hot beef dinner).

Corn Silage Tips

by Dr. Bill Mahanna, Pioneer HiBred

Corn silage can be thought of as grass with high-moisture corn attached. Having that perspective helps one focus on the key traits that need analyzing when feeding new-crop silage or selecting next years' silage hybrids.

As corn genetics improve, it is not surprising that silages are increasing in quantity of starch. The Pioneer Livestock Nutrition Center analyzed corn forage (not yet fermented) samples from 3414 customer plots in 1993, with the average starch content of 22.7%. In 2002, 3614 customer plot samples were analyzed containing an average of 27.8% starch. It is not uncommon to find upwards of 35% starch in midwestern corn silage samples. If the crop is high cut (e.g. 18 inches vs.

(Continued on page 2)

Canada Post Publications Agreement #40949041

Corn Silage Tips (continued from Page 1)

traditional 6-8 inches), it is not uncommon to find starch in the low-to-mid 40% range.

Given the variability in grain yield from both genetics and subsequent growing conditions and management, it is critical corn silage be analyzed for starch content. Nutritionist can then use tools such as the University of Wisconsin MILK2000 spreadsheet: http://www.uwex.edu/ces/crops/uwforage/dec_soft.htm that incorporates starch content along with NDF digestibility (%NDF, 48 hr) and other nutrients to estimate net energy of lactation (NE-L), milk per ton, and milk per acre.

The use of on-chopper roller mills to process corn silage can also have an effect on the variation in the rate and extent of corn silage starch digestion. To simply say silage was processed is not enough. What is needed is information on the roller mill setting (e.g. typically 1-5 mm depending upon kernel maturity) and objective quantification of the extent of subsequent kernel damage. A standard laboratory procedure is currently being used at Pioneer and is also commercially available as a corn silage processing score at Dairyland Laboratories, Inc. to help quantify the degree of kernel damage. However, because this analysis is not a field test, producers still need to discuss processing goals with their nutritionist and custom cutter (if outsourcing chopping) and develop their own (bunker or silo-side) system for monitoring number of undamaged kernels in a given volume of silage. It is important to monitor each chopper several times per day to ensure processing consistency across fields and hybrids.

Some growers have expressed concern about the texture or vitreousness of corn kernels in silage. The most recent work on vitreousness, per se, comes out of the University of Wisconsin and supports that silage, harvested wetter than about 35% DM, exhibits very little differences in starch digestibility attributable to kernel texture or vitreousness. Specifically, that ruminal starch availability showed a decline only after the blacklayer stage of maturity.

There are some that suggest corn silage can have too much grain (starch). Their logic is that grain can always be added to corn silage and one should not sacrifice fiber digestibility to obtain high grain yields. This assumes that high grain yield and high fiber digestibility are mutually exclusive traits….which research show they are <u>not</u>. Several researchers have shown no relationship between grain content and stover digestibility and conclusions from the four-year UW corn silage consortium shows that while evaluating forage potential of hybrids might require separate testing programs, grain yield need not be sacrificed when developing hybrids with high dry matter yields and improved nutritive value.

This notion that corn silage can have too much grain seems to also conflict with commonly held guidelines for the amount of starch dairy cows can safely handle in the ration. To put this in perspective, one can consider an extreme example of 70 lbs. of 30% DM corn silage containing 50% starch (highly unlikely, even with high-chop corn) consumed per cow per day. This would only contribute 10.5 lbs. of daily starch intake. If cows are consuming only 50 lbs of dry matter intake, the total ration starch level from the corn silage in this extreme example would only be 21% starch. This is well within the acceptable guidelines of most nutritionists. By maximizing starch from corn silage, one can significantly reduce ration costs from supplemental starch without having to sacrifice reduced fiber digestibility.

Moving on to the "grass" portion of the plant. It is clear that reduced stover (cell wall) digestibility can "handcuff" a nutritionist. Variability in corn digestibility impacts both the energy value and intake potential of the silage. However, when it comes to selecting corn silage genetics to plant, the fact is, there are minimal genetic differences between (non-bmr) hybrids for NDF digestibility. The huge variation in NDFD observed by nutritionists is more a function of planting population, growing environment, harvest maturity, and fermentation efficiency. Growers should certainly consider fiber digestibility when selecting hybrids to grow, but its selection pressure should be below that applied to agronomic traits, grain yield (starch content), and silage tonnage.

The influence of growing conditions (especially moisture) seems a major source of the nutritional variability seen within hybrids across years and locations. Early research suggests that cool, dry years are best for corn silage quality and that slight moisture stress might stimulate seed (grain) production. Cool temperature (especially at night) may inhibit secondary cell wall development. These studies suggest that accumulated growing degree days

Independent Ontario Forage Variety Testing in Danger

Independent forage variety testing in Ontario is facing serious funding problems after recent comments from the University of Guelph.

The cost of the forage variety testing program at the Elora research site will realize significant cost increases due to new U of Guelph land usage charges. After previous U of Guelph cutbacks in 2002, independent forage variety testing at Elora has been funded by CORDIII research funds directed by the OFC and fees paid by the seed companies. However, with the new land usage charges and completion of CORDIII research funds the cost of this program will jump by an estimated 50% leaving the future of independent forage variety testing at Elora at serious risk.

Forage research testing in Ontario is overseen by the Ontario Forage Crops Committee (OFCC), which evaluates the performance of experimental and commercial varieties of forage seed varieties under Ontario conditions and then summarizes this in the Forage Crop Variety Performance brochure.

The loss of independent variety testing is a major concern to producers in Ontario. Surveys conducted by the OFC indicate farmers rely heavily on forage variety test results when choosing varieties and research conducted under independent conditions within Ontario is of major importance. Data collected from Elora's research site is particularly vital because it is centrally located within in a major agricultural production area.

The Ontario Forage Council is working with the OFCC to maintain Ontario's independent forage variety testing program. Its initial step was a presentation to the Dairy Farmers of Ontario, which resulted in a commitment of $5,000/year.

The OFC recently arranged a meeting with U of Guelph, Vice President, Rob McLaughlan to discuss the implications. This was an extremely productive session and with strong support from all livestock sectors and the seed industry Rob made a firm commitment to honour existing agreements and work cooperatively with the Ontario Forage Council.

Corn Silage Tips (continued)

after silking may be most important in affecting corn silage nutritive value because of the impact on grain yield.

The specific timing of environmental stress during the development of the corn plant appears important. In a cooperative research study with Pioneer and Dr. Dave Mertens with the US Dairy Forage Research Center analyzed unfermented whole plant corn samples from various genetics grown in multiple locations, with each location geo-referenced to allow for weather station data to be included in the analysis. Early indications are that weather prior to silking, affects corn plant height (and yield) and fiber quality. Weather after silking appears to exert more effect on corn grain yield, neutral detergent solubles:NDF ratio, and total dry matter digestibility (Mertens, 2002). The 2003 growing season in the upper Midwest proved a good example. Adequate moisture through silking resulted in average-to-below-average fiber digestibilities and the dry weather from silking to harvest resulted in reduced starch fill. The environmental conditions conspired to produce only fair corn silage. High chopping the 2003 crop might have been a good idea because it would have concentrated the grain and helped increase NDFD by leaving the most indigestible portion of the stalk in the field.

Here is a management checklist to help growers and nutritionists manage and reduce corn silage variability:

1. Foster communications between dairy producer, nutritionist, growers, and custom choppers because the dairy has to live with these decisions for an entire feeding year.
2. Select hybrids with proven (and similar) nutrient profiles backed by adequate yield and nutritional data.
3. Minimize number of hybrids to improve consistency (without compromising agronomic risk).
4. At harvest, focus on harvest timing (chop individual plants, shred in a chipper-shredder and analyze with a Koster or microwave for whole plant moistures), degree of kernel processing, and bunker/pile compaction (especially tails of piles).
5. Consider segregating silage (by quality and livestock group).
6. Inoculate silage with a research-proven product to improve both feed value and consistency (VFA profile, smell, taste).
7. Analyze silage for starch, and NDFD and use the Schwab-Shaver NE-L estimate from MILK2000.
8. Monitor kernel processing on the way into the pit and quantify with lab test during feed-out, and

Forage Feeding and Altering Fatty Acid Composition of Milk & Meat

by Dr. Ira Mandell, University of Guelph Beef Researcher

Consumers worry about the fat they consume, the amount of fat they eat in a given day along with the type of fat. Health professionals recommend that we decrease our total dietary fat consumption. However, when consuming foods containing fat, we can also benefit from decreasing the amount of cholesterol elevating, saturated fatty acids while increasing our consumption of mono- and polyunsaturated fatty acids. The proportions of the types of fatty acids (saturated, monounsaturated, polyunsaturated) in milk and meat can be affected by the diets we feed to ruminants (cattle, sheep, goats). Extensive forage feeding to ruminants tends to increase the amounts of polyunsaturated fatty acids in milk and meat; this includes increased deposition of an omega-3 fatty acid, alpha linolenic acid. Increased consumption of omega-3 fatty acids by consumers is recommended as these fatty acids help protect against cardiovascular disease and may have anti-carcinogenic properties. Consumers are now finding omega-3 fatty acid enriched products at the grocery stores with eggs (from laying hens fed flax which is rich in linolenic acid) and milk (from dairy cows fed fish meal which is a rich source of omega-3 fatty acids or from the addition of flax oil when milk is processed). The source of linolenic acid from forage feeding is the plant itself with the linolenic acid content of forages varying with species and variety.

Extensive forage feeding can also increase the concentration of another beneficial fatty acid for human health, conjugated linoleic acid or CLA. This fatty acid also has anticarcinogenic properties. CLA is not found in plants but is a product of microbial fermentation that occurs in the 2 chambers of the ruminant stomach that function as a fermentation vat. Both omega-3 fatty acids and CLA are found in higher amounts in milk and meat when ruminants are fed predominantly forage diets with only small amounts of grain, as compared to the feeding of high amounts of grain such as intensively fed dairy and beef cattle. The lower amounts of omega-3 fatty acids and CLA in grain-fed, dairy and beef cattle are due to lower amounts of linolenic acid and precursors of CLA in typical diets containing grain, and alterations in microbial fermentation in the ruminant stomach when high grain diets are fed.

By extensive feeding of pasture or conserved forages, beef, dairy, sheep, and goat producers have the opportunity to produce milk and meat with a more desirable fatty acid composition as compared to feeding concentrate/forage diets to ruminants with high amounts of grain. However, there are downsides to extensive forage feeding and the production of meat and milk. The lower available energy in forages as compared to grains often will increase production costs so that producers will need a higher return for the milk and meat they market. However, more and more specialty or niche markets are being developed where consumers are willing to pay a higher price for products that may have a health benefit or uniqueness in flavor or texture. The higher concentrations of polyunsaturated fatty acids in forage-finished ruminants can impart a grassy or gamey taste in meat and could impact shelf life of the product. However, consumers may not detect this grassy or gamey taste depending on how the meat is prepared or may desire this unique flavor that is also found when consuming meat from wild ruminants.

Thus extensive pasture and conserved forage feeding to ruminants may provide producers the opportunity to produce a value-added, niche product.

Looking for Technical information on:

?

- **Fertilization**
- **Forage Variety Testing Statistics**
- **Bale Wrap Recycling Programs**
- **Cutting Schedules**

For quick easy, access to useful forage information check out our website at: www.ontarioforagecouncil.com

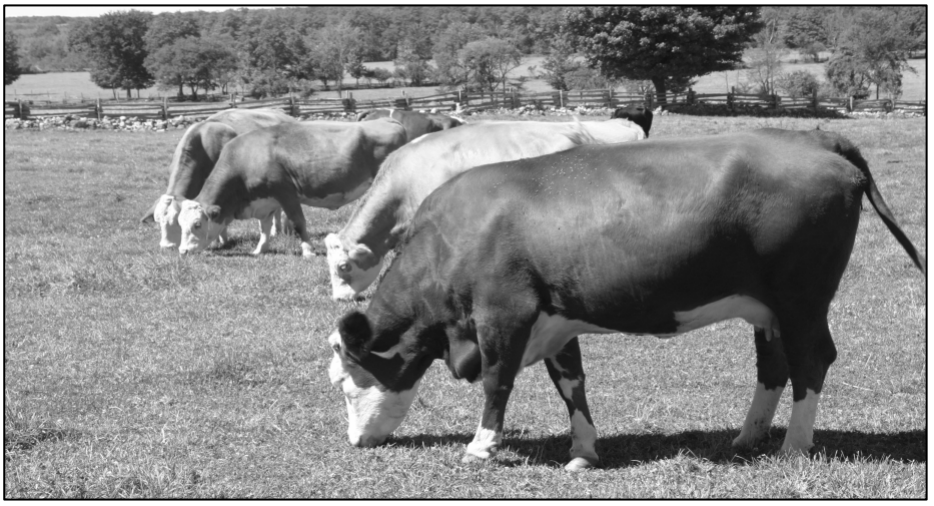
Project to help beef producers get more 'bang' for forage 'buck'

A new demonstration project has been launched to help Ontario beef producers improve production efficiency and reduce greenhouse gas emissions through more accurately balanced feed rations. "The quality of forage fed to beef cattle varies significantly and can have a major impact on production efficiency," says project leader Dr. Vern Osborne of the University of Guelph. "We will work directly with producers to analyse forage quality and develop recommendations for improved feed rations. Understanding the digestibility of fibre and energy helps determine the best feed for cattle." The two-year project is supported by the Greenhouse Gas Mitigation Program for Canadian Agriculture (GHGMP), a federal program designed to promote awareness of agricultural practices that reduce or remove atmospheric levels of greenhouse gas.

"Improved ration balancing is one of several beef production management strategies with the potential to boost production efficiency," says Pat Walker, beef sector co-ordinator for the GHGMP. "

The demonstration project will introduce an innovative method for testing fibre digestibility. Analysis of Neutral Detergent Fibre digestibility (NDFd) provides a measure of digestibility for a key fibre fraction in plant cell walls. By measuring the fibre digestibility, producers will have a better understanding of how they can get a higher energy value in their forages. Results of this test help livestock producers balance feed rations and predict an animal's dry matter intake and performance while consuming the forage.

Although existing tests are available to measure NDFd, the latest method is more affordable and practical for



producers. "Currently, we can only estimate what the digestibility rate is and this leaves room for errors," says Osborne. "Rations developed from an estimate run the risk of being skewed. But NDFd gives a much more accurate read of actual digestibility." Osborne will lead a team to determine appropriate feed rations based on NDFd testing results. The team will organize 200 participants who farm in either the cow-calf or beef feedlot sectors of Ontario. Over the 2003-2004 winter, baseline feed samples were collected and analyzed for forage quality and NDFd measurements taken.

Now in phase two of the project, project leaders are developing management strategies, ration balancing and greenhouse gas reduction estimates. Forage samples will be collected three times in the year from selected participants and tested to track forage quality and NDFd data.

Information on using NDFd testing for ration balancing will be presented at farm workshops, and results of the on-farm component of the demo project will be available in beef industry publications, farm shows and OFC website located at www.ontarioforagecouncil.com.

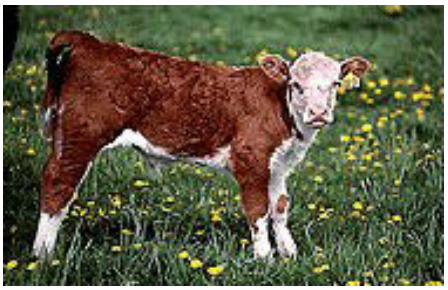
NDFd testing has not been widely adopted in Ontario due to the limited facilities offering this type of test, says Osborne. The test is quite labour intensive as well, taking 30 to 48 hours to complete. Despite these obstacles, NDFd testing does provide producers with an accurate reading of forage quality and digestibility. "We like to say 'garbage in garbage out' when talking about forage quality," says Osborne. "Feeding high quality forage and knowing its contribution to the diet is key to having a balanced diet for a healthier animal and reduction in nutrients being emitted into the environment."

The Ontario Forage Council is experimenting with a new hay listing. Pick up its link from our website at www.ontarioforagecouncil.com

This hay listing includes buyers and sellers in Canada and the United States.

Fall Pasture Management Tips

by Jack Kyle, Grazier Specialist, OMAF



Late summer is not the time to neglect your pastures. How you manage your pastures during this period will affect the productivity for the remainder of this year and next year.

Having pasture until Christmas is an achievable goal for anyone, but there are a few things to keep in mind if you want to achieve this goal.

The fields that are to be pastured after the end of the growing season need to be given time to grow and accumulate forage for late season grazing. Choosing the right fields is important and then give the forage plants ample opportunity to grow and accumulate forage during the fall. During August and early September there is still sufficient day length and heat to promote good forage growth, once we get to late September the days are shorter and the night time temperatures low enough that very little forage is going to accumulate.

What steps can you take now to ensure that there will be forage for the November-December period?

First is to select the fields that you want to use for stockpiled forage. Choose fields that have a good forage stand and ones that are reasonably well drained. Grazing during wet fall conditions can damage the plants if the livestock are pugging or leaving deep hoof prints. Stockpile grazing is best achieved in fields where the animal movement can be controlled and fresh strips of forage or new paddocks can be provided at least every week and preferably every few days. If the livestock have uncontrolled access to the entire area they will selectively graze and after a couple of weeks the forage quality will be greatly diminished.

The second step is to stop grazing the fields that you want to use for late fall grazing and allow the forage growth to accumulate. This is an important step in the process of setting up a stockpiling system. There must be sufficient accumulation of forage to provide the livestock with their feed requirements for the intended period.

The third step is to apply fertilizer to stimulate forage growth. Nitrogen applied in the late summer on grass pastures will stimulate fall growth and allow the plant to develop a strong root system for the fall. Nitrogen at this time will also promote top growth that will provide feed for the fall grazing. An application of 50-6- kg/ha of nitrogen will give a positive response.

If you have trefoil in your pasture it should be allowed to flower and set seed sometime during the year. Trefoil is a short-lived perennial that can re-seed itself if allowed to flower and fully develop the seedpods. If the trefoil has not had the opportunity up to this point in time then give it a fall rest to allow seed set. The trefoil can then be grazed later in the season after all growth has ceased. Trefoil is actually one of the better legumes for stockpile grazing as it holds its quality well into late fall and early winter.

By following these three steps you will provide the late summer forage management that will allow you to extend the grazing season into early winter.

There are several other ideas that will provide forage for your livestock during the later part of the grazing season. Crop residues can provide excellent quality forage. Don't over look cereal stubble, there will be some volunteer grain in these fields that can be grazed or they can be seeded with oats or barley immediately after the cereal harvest. If clover was broadcast in the spring

for a plow down/cover crop, consider grazing this growth as livestock feed. Corn stalks can provide a great deal of forage after the grain has been harvested.

With some planning and action in August there can be lots of opportunity to extend the grazing season through to early winter or in some cases late winter. For more information go to the OMAF website: www.gov.on.ca/OMAFRA/english/index.html and search for "stockpile grazing" or "late season grazing."

Agronomy Guide Available on Internet

The *Agronomy Guide For Field Crops*, OMAF Publication 811 is available on-line at www.gov.on.ca/OMAF/english/crops/pub811/p811toc.

The guide includes an extensive Forage section

Preventing Mouldy Hay Using Propionic Acid *by Joel Bagg, Forage Specialist, OMAF*

Trying to make dry hay between rainstorms can be frustrating. When haymaking periods without rain are short, we frequently get into a no-win situation. Either the hay isn't dry enough to bale before the next rain and it gets rain-damaged, or it gets baled "tough" before it is quite dry enough and becomes mouldy, poor quality, dusty hay. Propionic acid can be used as a dry hay preservative to prevent mould when baling hay at moistures otherwise too high.

Mould Damage--Moulds greatly reduce the value of dry hay, particularly when targeting the "quality" horse hay or dairy hay markets. Moulds consume hay nutrients and cause dry matter losses, as well as produce toxins that are detrimental to animal health. Mouldy, dusty hay contains spores that can cause respiratory problems, particularly with horses. Mould growth can even result in hay fires from spontaneous combustion.

Propionic Acid Preservatives--Propionic acid is an organic acid that acts as a fungicide, inhibiting the growth of aerobic micro-organisms that can cause heating and moulding. Other organic acids, such as acetic acid are sometimes also included, but propionic acid is the most effective. The propionic acid inhibits mould growth while the bales "sweat' and "cure" down to safe moisture levels by dissipation and evaporation. Do not confuse organic acid hay preservatives with enzyme, bacterial inoculant or nutritive additive products, which have different modes-of-action and are generally less effective. Propionic acid is sprayed onto hay as it enters the baler. Equipment includes a baler-mounted applicator with a pump, nozzles, and tank.

Hay treated with buffered propionic products is safe to feed to livestock. Propionic acid is an organic acid that is also produced by rumen bacteria and then used by the animal as a nutrient.

The Hay Drying Curve--A standing crop of forage is about 70 – 80% moisture. Initially the drying rate is quite rapid, but slows considerably when it gets to the low 20s. Getting the moisture down that last few percent before baling can take a lot of drying time. Inevitably, there will be situations when the storm clouds are moving in, but the hay isn't quite ready to bale. Rain on almost-dry raked hay is much more damaging than rain on hay that has just been cut. Using propionic acid enables us to bale considerably earlier. This is especially true with poor, slow drying conditions, such as high relative humidity and low wind speed. With large square balers, the use of propionic acid is almost a necessity, because the moisture must be very low to avoid spoilage.

Buffered Acid Products- The original propionic acid products were unbuffered, which meant they were highly corrosive, very volatile, and difficult to work with. Most products now marketed are buffered propionic products - ammonium, calcium or sodium salts of propionic acid. Buffered products are much less volatile and corrosive, making them much easier to use. Products differ in concentration, so purchase decisions should be based on the price per kg of active ingredient.

Follow Label Directions - Read and follow label directions. Enough acid must be applied using the correct rate of active ingredient at various moisture levels for it to work properly. Different products have different concentrations of active ingredient. Using very dilute products provides greater coverage, but requires more water to be applied on the hay you are trying to dry.

Recommended Moisture Levels – Optimum moisture levels for safe storage vary according to bale type and density. Dry hay storage moisture guidelines without propionic acid for various bale types are:

Small square 15 – 18%
Large round (soft core) 13 - 16 %
Large square & large round (hard core) 12 – 15 %

Specific acid application rates at various moisture levels are detailed on the product labels. At lower moisture levels, product costs are typically in $7–14 per tonne range. If targeting quality hay, these costs are easily recoverable. While some product labels indicate acid can be added to hay up to 35% moisture, this would be at a much higher risk of heating & spoilage, as well as costing over $40 per tonne of hay for the product, making this less practical. When using propionic acid, most hay producers seldom exceed 25% moisture.

Using Electronic Moisture Testers - An accurate measure of hay moisture is required to determine the proper application rate. Electronic moisture testers estimate percent moisture by measuring the resistance of electricity to move through a hay sample. The wetter the hay, the more electricity flows through. There are 2 basic types - hand-held probe and in-chamber. In-chamber types enable the operator to monitor moisture on a continual basis from the tractor seat. They are virtually standard on large square balers and also available for large round and small square balers.

Electronic moisture testers are an excellent tool, but keep in mind that they can be subject to error. Hay can gain or lose 3-5 % points of moisture in an hour, and there can easily be 5 % points of variation in a windrow. Accuracy is affected by bale density, whether it is grass or alfalfa, whether it is plant moisture or dew moisture, and whether acid has already been applied. Electronic moisture testers need to be calibrated to the

Preventing Mouldy Hay Using Propionic Acid (con'd)

conditions and be well maintained. Beware digital readings can give you false sense of accuracy. Moisture testers should be used to supplement personal experience.

Applicator Capital Costs - Basic acid applicators, including a small tank, pump and nozzles, start for less than $1000. Adding bigger tanks, in-line moisture sensor and automatic flow regulators (to adjust application rate on–the-go) will add a few thousand more to cost. Probe-type hand-held moisture testers run at about $300.

When Is Using Acid Most Economical? - The main advantages to using propionic acid to preserve hay are less mould, reduced drying time, less potential rain damage and more weather suitable for baling. Using propionic acid provides baling flexibility. You can start earlier, quit later and keep the baler baling when the weather isn't perfect.

There are 3 situations when propionic acid application to dry hay is most economical:

- used strategically to avoid rain damage if the weather doesn't co-operate
- large dense bales that are difficult to dry to low enough moistures to avoid mould
- custom operators and producers baling large volumes that can pass the costs onto customers that demand mould and dust-free hay.

Baling at higher moisture also reduces mechanical harvest loss from leaf shattering and should increase forage quality. So, does it pay to use propionic acid all the time and bale at higher moistures to prevent leaf loss, or only strategically when the weather doesn't co-operate? This will depend on the expected amount of leaf loss, the final value of the hay product and the nutritional requirements of what it will be fed to. Routine acid application to reduce leaf loss on alfalfa hay would be more economical than on grass hay, and more beneficial for hay being fed to dairy cows than beef cows.

Cautions - There is a "learning curve" for a high batting average when making "no rain, mould-free" hay. Although a useful and successful tool, the use of propionic acid will add to that learning curve.

Application at the correct and uniform rate is key. Uneven windrows or fields with wet spots will not have uniform moisture. Use a moisture tester to determine application rate, using the highest reading. If you use the average reading, you won't get enough acid on much of the hay to prevent spoilage. Spraying should be as uniform as possible to ensure good coverage.

Hay can still heat and become mouldy and discoloured if inadequate acid is applied. Tightly stacked bales in a confined area don't allow the bales to "sweat" and cure. The acid can dissipate in 4-6 months, which may be before hay moisture is low enough if conditions are unfavourable. Extended periods of high humidity will extend the curing time. Don't store treated and untreated dry hay in direct contact as the moisture will migrate to the dry hay.

Some horse owners aren't comfortable feeding acid treated hay and won't purchase it. There may initially be some propionic odour in the hay until it has dissipated. Be sure to inform hay buyers that propionic acid has been applied.

Conclusions - Propionic acid is most economical when used strategically to avoid rain-damage and mould with poor weather conditions. Propionic acid is very effective with higher density bales, such as large squares, that need to be drier at baling to avoid mould growth.

The Ontario Forage Council
Box 463
Markdale, Ontario, N0C 1H0
1-877-892-8663
www.ontarioforagecouncil.com
Email: info@ontarioforagecouncil.com