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Marketing Manitoba Hay to Wisconsin and Kentucky

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Introduction

There is an expanding market for Manitoba hay throughout the U.S and overseas markets. This paper focuses on the dairy industry in Wisconsin and the equine market in Kentucky as potential importers of Manitoba hay. Farmers in Manitoba looking to market their hay to either one of these two markets must be aware of consumer demands, the structure of hay markets within the two states, consumer behavior, costs and revenues involved, and restrictions involved when transporting hay into either of these two markets. This report focuses only on alfalfa hay production although many of the topics covered will aid any commercial grower with a broader understanding of these two distinct markets.

Forage Preferences in the Dairy and Equine Markets

Components of Forages

Dairy farmers and horse owners consider different characteristics when defining good quality hay. Quality can be defined as the ability of a forage to support a desired level of animal performance. Since the ultimate function of horses and dairy cattle differs dramatically, it is no wonder that the two industries differ in what they deem the most important forage characteristics to be. The quality of alfalfa forage can be characterized in many ways, including color, leaf content and chemical composition. Describing forage quality by chemical analysis provides the least subjective and most uniform system for describing forage quality. Chemical analyses most commonly used as measures of forage

quality are: neutral detergent fiber (NDF), acid detergent fiber (ADF), crude protein (CP) and mineral concentrations.

Neutral Detergent Fiber (NDF) is defined as a percent of cell wall material in a forage (Klemme et al, 1988). It represents the total fiber portion of feed which affects forage intake. The NDF portion of a forage is only partially digestible, therefore the higher the percent NDF, the lower the intake of forage by the animal. Acid Detergent Fiber (ADF) is defined as percent of highly indigestible plant material composed of cellulose, lignin, and other poorly digested fiber components. Acid detergent fiber is a key component of energy prediction, with lower values indicating that a forage will be more digestible and higher in energy than one with high ADF values. Crude Protein (CP) is defined as the percent of protein and nonprotein nitrogen in forages. It is estimated by measuring the nitrogen content and multiplying it by 6.25. An alfalfa hay containing 3% nitrogen on a dry matter basis will have a crude protein content of 18.75%. Crude protein however is not a good predictor of energy availability in the hay. Energy may be calculated using the acid detergent fiber and crude protein from a forage analysis. The energy value of hay is expressed as Digestible Energy (DE) in units of megacalories per pound (Mcal/lb.) or as total digestible nutrients (TDN) expressed as a percent of dry matter. TDN are a list of essential nutrients found in feed. They include: crude protein, carbohydrate, crude fiber, ash and trace minerals. The energy content of hay is determined indirectly by first measuring the fiber fractions of forages and then estimating the energy content as follows:

(1) TDN = 78.5 - 1.01 (%ADF) + 0.823(%CP)

(2) DE (Mcal/lb.) = 0.225 + 0.0366 (%TDN)/2.2

The higher the fiber content of hay, the lower the digestibility or energy content.

Minerals are important for all aspects of proper growth, development and good health. Alfalfa is an excellent source of many minerals including calcium, phosphorous, potassium, magnesium, sulfur, iron, zinc and selenium.

Preferences of Dairy Farmers

For diary production, high quality forage is essential for economic rations and high milk production. Rations typically consist of grain, concentrate supplements (e.g. protein), minerals, and forage. Feeding more grain and protein concentrates can raise nutrients to the required needs however this results in two economical limitations. Feed costs are increased thus reducing profit margins. Also, Wisconsin researchers report that cows cannot produce as much milk even with as much as thirty percent more grain in the ration with lower quality forage (Hutjens, 1996). Dairy producers looking for high quality forages focus on the chemical composition of the hay. They especially favor high TDN and Relative Feed Values (RFV). Relative Feed Value is a measure of a feeds digestibility and palatability. A single numeric value is assigned to a forage which reflects the sum total of several forage quality attributes including: color, texture, percent TDN, moisture content and percent of foreign materials. It can be calculated as follows:

$$(3)\quad RFV = \frac{(88.9 - .779\ ADF\ (\text{as a \% of Dry Matter})) \times (120 / NDF\ (\text{as a \% of Dry Matter}))}{1.29}$$

According to Dr. Neil Martin from the University of Minnesota, the first equation for Relative Feed Value was derived from animal feeding data using medium quality alfalfa hay. It is an arbitrary factor directed for lactating dairy cattle and has been used ever since RFV was put into place. The American calculation for RFV is highly regarded by farmers in the dairy industry to be a quality reading that the cows agree with.

Dr. Tracy Gilson from Norwest Labs indicated that Manitoba uses the American equation (3) as well for calculating Relative Feed Value.

Manitoba farmers who have tested hay both in the U.S and Manitoba have found a discrepancy in the RFV results. The observation has been that the RFV in the U.S is usually higher than the RFV given in Canada. Gilson revealed that differences in values are due to the differences in samples used in the Near Infrared Reflectance Spectroscopy (NIRS) database. Once the NIRS readings are given and some information regarding the tested forage are entered, the NIRS database compared this information to the samples given within the database to come up with an estimate for RFV. In Manitoba, the database is composed of random samples from Vancouver, Manitoba, Saskatchewan, and Alberta. When getting hay tested in Wisconsin, the majority of their database is composed of random samples from mainly Wisconsin. For this reason, when Manitoba forage is tested in Manitoba, the results are likely to be more accurate compared to when testing in Wisconsin.

In Wisconsin, relative feed value (RFV) has gained acceptance as one method to evaluate forage quality. A RFV between 130-180 is ideal for high producing dairy cows and young heifers. With higher relative feed values, forage has a fast rate of passage and less effective fiber which lowers the level of nutrient absorption. In Wisconsin, dairy

farmers have also recognized the value of forage quality where they have paid premiums for higher quality alfalfa hay at forage quality tested hay auctions averaging $0.95 per point of relative feed value between RFV's of 100 & 150- Table 1 (Dan Undersander et al, 1996).

In dairy animals, fiber is necessary to allow for normal rumen function, yet too much fiber will reduce energy and total feed intake. NDF requirement for milking cows is estimated to be 1.2% of body weight when most of the dietary fiber is provided through forage.

Little emphasis is placed on mineral concentrations of forage for dairy thus analysis of forages for mineral content is not routinely performed. However, mineral analysis may need to be considered for livestock on a high plane of nutrition (e.g. a lactating dairy cow). Although vitamins are required by livestock in very small amounts, their availability in forages is quite variable. Forage analysis for vitamins is rarely performed unless livestock health problems are suspected. Routine additions of vitamins and minerals to rations are recommended to meet nutritional requirements (Trotter et al, 1995).

Preferences of Horse Owners

Unlike the dairy industry which is more concerned with the chemical composition of the hay, the equine industry favors hay that is visually pleasing. Markets in Kentucky require and demand the best quality hay because this hay is consumed primarily by race horses. In general the horse hay buyer prefers hay that is free from mold, dust and foreign material, has high leaf attachment, a bright green color and soft texture. Leafiness is important since this constitutes the highest quality portion of the plant. Forages should be

analyzed for calcium and phosphorus in particular and knowledge of magnesium, manganese and copper may be important. Calcium and phosphorus are the mineral elements required in highest quantities because of their importance in bone formation. From a cost effective sense, extensive mineral analysis is not practical.

Horse owners are sensitive to these organoleptic characteristics due to the many illnesses and diseases that the horses are susceptible to. The consumption of moldy hay may lead to a potentially deadly ailment known as Colic. Also, a chronic obstructive pulmonary disease (heaves), which is comparable to asthma in humans, may occur in horses exposed to dust in their environment (Jackson, 1992). The problem is minimized by elimination exposure to dust in bedding and hay. In terms of foreign materials, blister beetles are a big concern for horse owners. Horses are sensitive to catharidin, a compound contained in blister beetles. Colic, increased respiration rate, diarrhea and other symptoms result followed by death within 2 to 3 days in fatal cases. Fortunately for Manitoba, blister beetles are not a problem although they are present in the southwestern U.S. Therefore, if the current blister beetle situation becomes a serious problem, Manitoba hay will have a competitive advantage.

Few horse farmers look at Relative Feed Value when purchasing hay. This is because owners are not striving to achieve maximum gain, rather they feed hay as a filler and source of energy. Horses have a remarkably small stomach, nature's intention being that the horse should have a small amount of food in him all the time. This is the most basic reason for using forages as a filler.

Because the horse market is mainly concerned with the organoleptic characteristics of forages, visual appraisal is the only way to measure "quality forages". The term visual

appraisal is not limited to the sense of sight, it is also based on texture and odor. "Texture" refers to stem texture and its relationship to maturity at harvest.

Since visual appraisal relies heavily on subjective evaluation, it is possible that no two people will evaluate the same forage the same way. Factors such as the intended use and the evaluator's past experience can greatly influence the evaluation, and then it becomes very difficult to communicate descriptive terms. Cheap and efficient ways to quantify color, texture and odor would eliminate this problem and build credibility. Currently, inspectors for the Manitoba certification program use the Munsell Color Chart grading system to help eliminate some of the subjectivity.

Summary of U.S. Forage Demand

A study by forage extension specialists at Purdue University was conducted to determine the off-farm hay demand of dairy producers and horse farms in the southeastern states (O'Neill et al, 1990). The results to this study is in Appendix B. Although the survey does not include Wisconsin, the quality demands for alfalfa hay are indifferent between the dairy states. The survey of horse farms determined that 60 percent of the respondents preferred a 60 pound bale of alfalfa or alfalfa-grass that lacks mold and foreign material, also that crude protein is the most important nutritional criteria. It is also interesting to note that the horse market buys over 70 percent of their forage needs of which 6 percent is supplied by Canada.

The dairy industry also prefer small square bales of alfalfa hay that lacks mold, is leafy and harvested at the desired maturity. Not surprisingly, unlike the horse industry, 87

percent of the dairy's surveyed would pay more for quality-tested hay. Crude protein is also the highest nutritional test of importance.

Although small bales have been the most common for the diary farms in Wisconsin, in recent years, the medium square bales (650 lbs to 850lbs) are becoming more popular (Fraser, 1995). The small square bales are of interest to the smaller dairy operations with stanchion systems. The medium square bales are for the larger dairies who are using the Total Mixed Ration (TMR) systems. A TMR system combines all feed requirements into one ration. By using medium square bales labor costs are reduced and a steer skid loader can be used to handle this size of bale. Larger bales (over 850 lbs) are difficult to handle with the smaller steer skid loaders.

Both the dairy industry and horse industry import alfalfa hay because the quality of hay produced in the region does not meet the requirements of either industry. Interestingly, by meeting the quality standards of one market, by default, you also meet the needs of the other. This arises because similar management practices are required to derive at a product that is of high quality in both instances. By harvesting during pre-bloom maturity, the forage demands by both industries are more likely to be met. This is a significant advantage to suppliers, because the same hay can be used in both markets. The number of previous cuts also has an impact on the quality of hay achieved. First cuts are less likely to have high quality attributes compared to the second cut. This is because of the lack of plant maturity and density of foliage. Leafiness is the highest quality portion of the plant and increases after the first cut. This occurs due to the increased stem and leaf density arising from secondary growth.

Structure Of Hay Markets In Wisconsin & Kentucky

Wisconsin Hay Market

The dairy state of Wisconsin and the equine state of Kentucky have the potential to be highly profitable hay markets. According to forage specialists and hay producers across the U.S, you can get hay if you want it in the U.S, but it's the good quality hay you'll have trouble finding (Holin, 1994)

A market in Wisconsin can be accessed directly to the buyers of hay through hay auctions. Weekly sales are held from December through April at different locations. The auctions facilitate the buying and selling of hay based on nutritional value. For that reason, a mobile testing laboratory that uses Near Infrared Reflectance Spectroscopy is on site for feed analysis. In the past, there has been a minimum lot sale requirement of 40 small square bales and 5 large round bales. For more information or a brochure contact Equity Co-op Livestock Sales (608-356-8311) or Midwest Livestock Producers (414-683-7480).

The World Dairy Expo takes place every year in Wisconsin during October and is open for everyone interested. This is an excellent place to make contacts and market your hay. The forage extension service at the University of Wisconsin also develops a hay list to help market hay. Internet hay marketing is also gaining popularity as a means of connecting buyers to sellers. It lists both buyers needs and sellers products. There is no internet hay marketing web site developed specifically for Wisconsin buyers but many customers found on the web are from Wisconsin, Kentucky, and many areas across North America. One such web site is the Hay Exchange (www.hayexchange.com). The internet

hay exchange is a fully automated test management system offering hay producers around the world the opportunity to promote their products over the World Wide Web free of charge (hay exchange, 1997).

Local producers are the primary competition for this market although this will vary as a result of changes in crop conditions. Areas that experience droughts, winterkill or heavy rains during harvest season allow a potential market for Manitoba hay. Good market intelligence is needed to seek out those areas with potential.

In past years, Manitoba growers have been able to develop hay markets in the dairy states primarily due to the high quality hay we can produce and the availability of backhaul trucking (Stewart, 1992). Backhaul trucking involves having a load to bring back on return to the point of origin. For example, a Manitoba farmer may transport hay to Wisconsin and after dropping off the hay, might acquire a load of soybeans to haul back to a Manitoba customer. This reduces transportation costs.

Kentucky Hay Market

Kentucky is a strong hay market for racing and equestrian horses. Most of the high quality alfalfa hay used in the horse market is bought from hay brokers. A certification program similar to Manitoba's was put into place although has not been popular due to inconsistent visual analysis of forages. Because the horse market purchases hay primarily on a visual basis, dealers will want to inspect the hay personally prior to making a large purchase. Samples of hay can be shipped to a dealer although this will affect the leaf attachment and possibly color of the hay. Forage testing is mainly used for the dairy and beef markets, not horses. There is a Kentucky forage listing service that is responsible for

marketing a large portion of hay. A person who has their hay tested in Kentucky and indicates it is for sale is automatically placed on the hay listing registrar. Kentucky's Department of Agriculture is responsible for this hay listing service. Competition to Manitoba hay in Kentucky will be from the surrounding Midwest states and irrigated hay produced in the western states. Dealers in Kentucky seldom have suppliers within the state due to the extreme variability in forage quality within Kentucky from year to year. The ability that Manitoba has in producing consistent quality would help to build trusting relations among Kentucky hay dealers. Some hay from other parts of Canada, mainly Ontario, have already been imported into Kentucky to meet the quality demands expressed by farmers. Our province has plenty of moisture, even in its dry years. Adequate moisture is a great advantage over the U.S. Most hay exporting regions of the U.S must irrigate in order to meet the demand of the markets it provides for. As the cost of watering increases, Manitoba will have an advantage associated with lower operating and production costs. This will allow us to under-cut our competition (McLean, 1996). Other states receive too much precipitation during harvest season which reduces forage quality.

Demand For Hay in the U.S

There is a lack of information regarding the movement of hay across the U.S. Looking at statistic reports, the level of production for each state and inventories remaining at year end can be seen. The question is, how much of the in-state production of forages are used in the state, AND, if the in-state production does not meet the demands, where are the extra supplies coming from? These questions are extremely difficult to answer without further studies and research. Questionnaires could be sent out to see

where the hay supplies for farmers are coming from. Another method of determining the supply required in state would be to estimate the amount of forages consumed per animal per day then use that estimate to determine the amount of forage needed to supply the level of livestock production.

Thomas Morgan, president of Morgan Research Group based out of Kansas does continuous analysis on the demands for forages in the U.S. He forecasts the future demands and supplies for forages. According to Mr. Thomas Morgan, demand for hay is increasing and will continue to increase for a few years. Rising cattle inventories and a growing export demand has led to an increased demand for hay within the U.S. There is a growing demand for milk and meat world wide as well as the growth of the equine industry thus also providing a positive outlook for the demand for hay (Morgan, 1996).

The states of Wisconsin and Kentucky utilize large quantities of high quality hay. In Wisconsin, most of the forage needs are satisfied by 'in state' production, although for consistently high quality hay dairy farmers in Wisconsin are looking to Canada. Very little is imported except in very dry years. Many dairy farms however, are separating the dairy part of the enterprise from the forage production and will likely be purchasing more forage on the basis or price and quality. The variation in climate, soils and management practices result in a wide variation in the type and quality of hay found in the North Central Region (e.g. Wisconsin). Also, this region also averages the lowest hay prices due to the region's large production and variable quality. This may be one of the reasons why, on average, prices obtained for hay in Wisconsin are less than what would be received if selling identical hay in Kentucky. The Southeastern region, where Kentucky lies, has a climate that is not conductive to alfalfa hay production, and so average yields per acre are low for

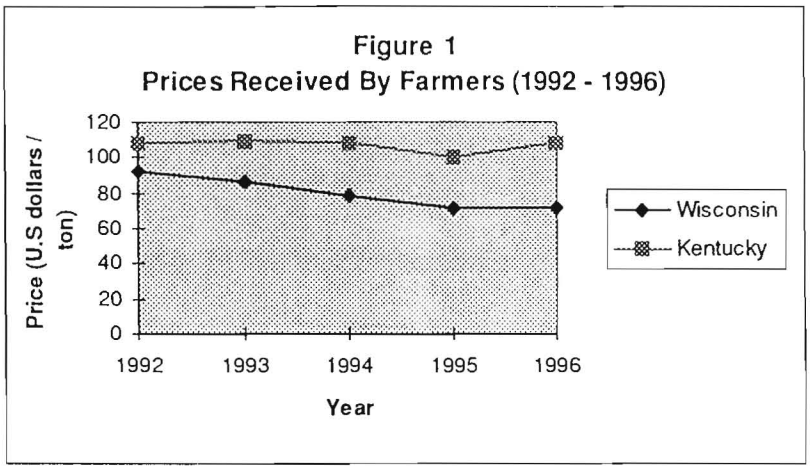
the region. Although Kentucky and Oklahoma produce over half of the alfalfa hay in this region, a sizable amount of alfalfa for horse feeding in the state of Kentucky is important in order to meet the demands of having high quality alfalfa hay (Morgan, 1996).

Revenues and Costs Associated with Marketing Hay to the U.S

Prices Received by Farmers

Like all commodities, hay prices vary according to the relationship between demand and supply functions. Weather conditions play a vital role in determining the amount and quality of hay produced. Horse and Dairy farmers demand high quality forages. Even if the supply of hay is high, the supply of high quality hay may be low thus increasing farmers' willingness to pay for a high quality product. This is what is occurring in areas across the U.S.

As mentioned earlier, Wisconsin dairy farmers base prices on relative feed values. Therefore, if Manitoba farmers use the calculation for RFV as used by Canada and the U.S, they can get a fairly good estimate of the price receivable. Generally, Manitoba hay producers will find that they will receive less for their hay in Winsconsin than compared to Kentucky. This is because Wisconsin has the ability to produce plenty of forage if weather cooperates. Kentucky does not have a good reputation for producing high quality forage year after year therefore the supply of such hay is limited. The average yearly prices from the last 5 years for each state can be seen in Figure 1. Although growers may receive a higher price for their product in Kentucky, transportation costs for this region are higher due to the longer distance and lower availability for backhaul trucking.



Transportation Costs

Transportation costs are relatively high for hay products compared to many other commodities due to the bulky nature of the products, low product value, and potential fire hazard. Farmers selling hay to the U.S normally use a free on board (F.O.B) destination pricing policy whereby the buyer pays for the transportation. Therefore, buyers of hay bear these transport costs. One exception to this occurs when a seller is bringing the product to an auction or to a market where he/she wishes the hay to be sold without having a buyer lined up. In this case, the seller pays for the transport up to the point at which a buyer is found. the buyer then bears the cost from the place of the auction to the farmer's yard.

The lowest cost system of shipping forages into the midwest U.S.A is by truck as a backhaul option either by flat deck trailers or vans. The major limitation for all transport systems is the density of the forage package. There must be sufficient weight to make the haul profitable.

Examples of Load Weights (small square bales):
Flat Deck Trailers, 600 bales @ 80lbs = 24 tons
Extended Vans (53ft), 550 bales @ 80lbs = 22 tons
Vans - 500 bales @ 80 lbs / bale = 20 tons

Flat deck trailers are generally the most expensive form of truck transport followed by van and then extended van transport as seen in Table 1.

TABLE 1

		Flat Deck Trailer		Extended Van		Van	
Madison, WI	717 miles	$860	$36/T	$735	$34/T	$717	$36/T
Lexington, KY	1259 miles	$1636	$68/T	$1448	$66/T	$1385	$69/T

Note: Winnipeg is considered as point of origin
Rates are some of the "current" costs used by some trucking firms.
(ref: Matrix Freight Services)

Costs of Production

The economics of production is another important factor to consider when looking at the revenues and costs associated with the production and sale of hay. By following a number of procedures and calculations, a farmer can use Manitoba Agriculture's Cost of Production Handbook to estimate their costs (see Appendix 2).

Manitoba Green Gold conducted a study in 1995 to help estimate an average farmer's cost of production. The project looked at what is cost the farmer to produce hay on a per acre, and a per ton basis. The results of the Manitoba Green Gold project are as follows. The average cost of production was $42/ton or $107/acre. The lowest cost was $19/ton, and the highest was $106/ton. This wide range of costs can be attributed to the value of machinery used on a per acre of land as well as forage yield affected by weather.

A farmer that uses top of the line equipment on a small area of land will have a very high cost of production.

Looking at Figure 2, one can visualize the costs of production associated with the number of forage acres. It is evident that the costs of production are reduced as the number of acres harvested for forage production increase.

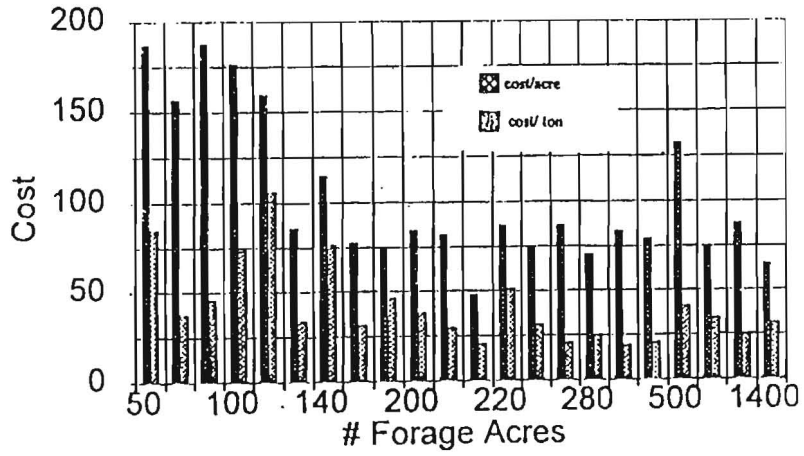


Figure 2: Cost of Forage Production in Manitoba

Transportation Restrictions

Farmers transporting hay to the U.S using trucking firms need not worry about the transportation restrictions. However, bona fide farmers hauling their own hay with F-plated vehicles need to be aware of the different regulations pertaining to each state. There are different legalities within each state. Depending on the route taken, a farmer will need to acquire a basic knowledge of the regulations within the states traveled. Appendix C lists phone numbers that can be contacted to receive information on regulations and requirements such as legal dimensions of loads, appropriate stacking methods of round

bales (if any), night hauling restrictions, interstate highway transportation restrictions, weight limits, flagging requirements, etc. The following allowable dimensions apply to most U.S states although may vary slightly.

Width = 8'6" Length = 65" Height = 13'6

In most states, hay permits can be purchased for loads exceeding the allowable dimensions. A hay permit will allow for an increased height, width, and length of load to maximum limit. In certain states, they allow an oversized load to a be carried into the state without a permit if within a certain number of miles after crossing the state's border. When traveling in the U.S, Manitoba farmer's must ensure that only amber fuel is used. If caught using purple fuel, up to $2000.00 U.S may be fined. Fine varies on size of fuel tanks. The carrier must be registered with International Fuel Trade Agreement (IFTA) by calling 1-800-782-0318. The IFTA decals must be displayed on vehicle and a copy of the IFTA license must be in the vehicle's cab. For more information on the regulations associated with specific states, contact either the appropriate permit agency or enforcement agency as provided in Appendix C.

Characteristics of the Hay Certification Program

The Hay Certification Program was initiated by the Manitoba Forage Council and is designed to facilitate the marketing of Manitoba hay by providing an unbiased analysis of hay available for sale. The analysis consists of a visual appraisal conducted by trained inspectors, and a chemical analysis performed by an accredited Forage Testing Lab.

The inspectors take random, unbiased samples from a lot of bales. Hay components such as; leaf attachment, stem size and texture; percentage of grass and/or legume, are described using standards and inspector knowledge and experience. A visual inspection to determine the species and mixture, odor, foreign material, and visibility of mold will also be noted. Information regarding storage and weather conditions at the time of baling is also recorded. Once the visual appraisal is completed, a chemical analysis is done by an accredited Forage Testing Lab. The lab tests each lot of hay for moisture, crude protein, calcium, phosphorous, TDN, ADF, NDF and RFV. Although there is a fee for providing this service, there are benefits to be gained form using the Certification Program. Most importantly, the buyer will know exactly what they are getting without actually having to see or test the hay first. This will allow the buyers to select the hay most suitable to their needs. For the seller, this program is an inexpensive and effective marketing tool. The list of certified hay advertises the farmers hay for sale at auctions, expos, conventions, and over the World Wide Web (www.escape.ca/~mfc/). Chemical analysis, bale size, quantity and type, asking price, and hay maturity at harvest are the main parts of the certification form advertised. Interested buyers wanting more information in terms of visual appraisal and storage can easily receive a copy of the certification form as filled out by the inspector (see Appendix A).

Appendix A - Hay Certification Form

MANITOBA HAY & STRAW CERTIFICATION FORM

The responsibility for hay weight, content, quality, purity and other specifications ultimately rests with the seller. Hay Certification is a procedure whereby individual hay or straw lots are described. The description below is based on an inspection. It is intended to standardize descriptions to aid the buyer and seller in their communication. Certified under the standards approved by the Canadian Forage Council.

Lot#: _____
Date of Inspection: (day)_____(month)_____(year)_____

A. Hay or Straw Identification

Crop Year: _____
Cutting No: _____ Cutting Date: _____ Baling Date: _____
Bale Type: ☐Small Square ☐Round ☐Other _____
Bale Size: Square(cm/in) -Length_____(_____) Round(m/ft) -Diameter_____(_____)
Width _____(_____) Width _____(_____)
Height_____(_____)
Bale Weight (kg/lb): _____(_____) ☐Estimated
☐Actual
Lot Size (tonnes/tons): _____(_____)
Method of Tying: ☐Plastic Twine ☐Wire ☐Netting ☐Sisal ☐Other # of Strands: ___
Drying Aid/Preservative: _____

B. Hay or Straw Description

Crop Species/Mixture: _____ Ratio: _____
Visible Foreign Material: ☐Present ☐Absent Description/Amount: _____
_____

Hay Maturity: Legumes - ☐Vegetative ☐Bud ☐Early Flower ☐Late Flower ☐Mature
Grasses - ☐Vegetative ☐Boot ☐Heading ☐Mature
☐Cereal Milk Stage ☐Cereal Dough Stage
Hay Color: ☐Dark Green ☐Light Green ☐Muted Green ☐Brown
Odor: ☐Fresh ☐Dull ☐Musty ☐Heat Damage

Rain Between Cutting & Baling: ☐No ☐Yes (mm _____ in_____)
Weather Damage After Baling: Depth of Damage (cm/in): % of Bales Affected_____
Sides - _____(_____) Ends - _____(_____)
High Moisture Hay Spoilage: % of Bales Affected: _____
Comments: _____

Visible Mold: ☐None ☐Slightly Dusty ☐Dusty ☐White Mold ☐Black
Leaf Attachment: ☐90% or more ☐75-90% ☐50-75% ☐Less than 50%
Stem Size: ☐Fine ☐Medium ☐Coarse
Stem Texture: ☐Soft ☐Medium ☐Hard

Other Descriptive Comments: _____

_____

_____

C. Type of Storage

Storage Structure: ☐Complete Weather Protection ☐Partial including roof & 1 to 3 sides ☐Shed with roof only ☐Outside stack tarped ☐Unprotected

Additional Comments: _____

_____

Name: _____
Address: _____
Town: _____ Prov: ____
Postal Code: _____
Phone: (____) _____
Fax: (____) _____
Best time to call: _____

Product Location (relative to nearest town or landmark): _____
Legal Land Description: _____
_____
Marking Method: _____
(include # of tags used)

Owner's Signature: _____ Date: _____
Inspector's Signature: _____ Date: _____

D. Feed Test Information

Accredited Lab of the producers choice: _____
Address: _____
Telephone: _____

Sample Number: _____ Wet Chemistry _____ NIR _____
Accreditation No: Canada _____ National Feed Testing Association _____
Analysis (Dry Matter Basis):

% Moisture _____ % Crude Protein _____
% Neutral Detergent Fibre _____ % Acid Detergent Fibre _____
% Calcium _____ % Phosphorus _____

Optional Feed Test Information (Dry Matter Basis):

ADIN _____
RFV _____ *(Relative Feed Value Index where RFV = (88.0 - 0.779 ADF) X 120 divided by NDF)*

1st Copy	2nd Copy	3rd Copy	4th Copy
Provincial Coordinator	Hay Certifier	Feed Lab	Farmer

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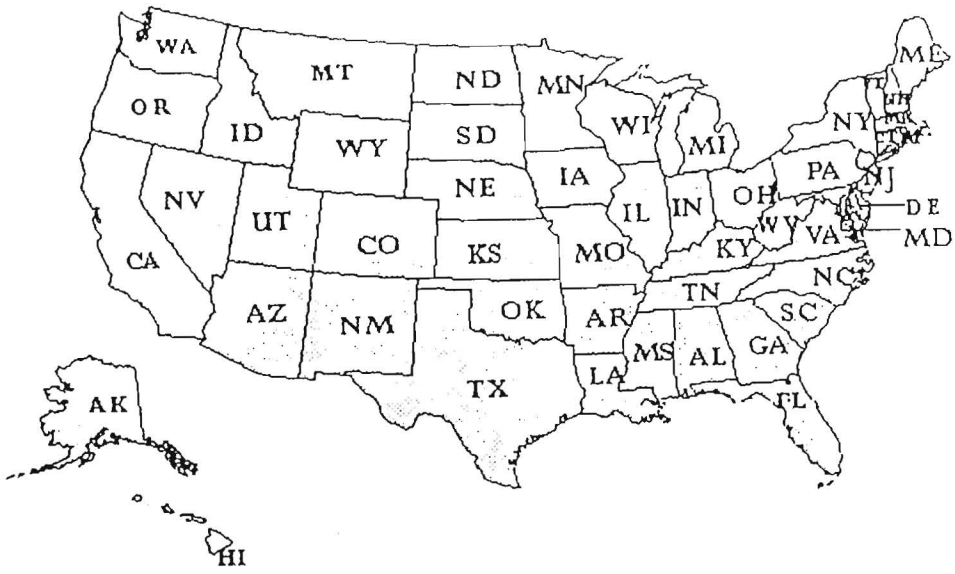
Appendix B - Results of the Study Conducted By Purdue University

Question	Farm	
	Dairy	Horse
	% of Respondents	
Nutritional tests of importance?		
Crude protein	88.5	80.8
Dry matter	56.5	28.7
Acid detergent fiber	47.9	27.5
Neutral detergent fiber	29.8	20.7
Acid detergent fiber-N	23.9	17.8
Mineral analysis	6.8	53.9
Willing to purchase preservative-treated hay?		
Yes	66.0	24.0
No	14.0	64.0
No preference	20.0	12.0
Source of hay?		
Produce for own use and sell some	5.4	9.5
Produce for own use only	35.7	4.1
Produce for own use and buy some	44.6	15.6
Buy all	14.3	70.8
Where do you purchase hay?		
Southeastern states	66.1	63.0
Great Plains states	26.7	18.0
North Central states	22.4	37.0
Northeastern states	9.8	14.0
Northwestern states	8.4	--
Western states	2.8	--
Canada	--	6.0
Why do you purchase hay from the regions indicated?		
Less transportation expense	57.0	42.0
Relations with supplier	51.0	55.6
Uniform quality	36.2	38.3
Lab testing done	6.3	17.4
Preferred source of market information?		
Neighbor	48.9	39.0
Local newspaper	8.9	12.0
Market newsletter	4.4	3.0
Hay auction	--	--
Hay broker	35.6	46.0

[a] Numbers totaled within a question's column can exceed 100% because of multiple responses to a question.

Question	Farm	
	Dairy	Horse
	% of Respondents	
Preferred type of hay?		
Alfalfa	72.3	34.0
Alfalfa-grass	6.4	26.2
Bermudagrass	12.8	13.5
Timothy	--	8.9
Red clover-grass	4.3	4.7
Orchardgrass	2.1	2.1
Preferred packaging?		
Small square bales (50-120 lbs.)	91.7	97.1
Small square bale weight preferred?		
50-65 lbs.	65.0	59.0
65-80 lbs.	20.0	34.0
80-95 lbs.	8.3	7.0
95-110 lbs.	6.7	--
Do you purchase recompacted hay?		
Yes	7.6	5.7
If you don't purchase recompacted hay, would you if transportation costs were lower?		
Yes	45.6	28.8
Preferred type of tie?		
String	65.0	59.0
Plastic	17.5	9.0
Wire	5.0	10.0
No preference	15.0	22.0
Visual characteristics of importance?		
Lack of mold	90.4	97.5
Leafiness	82.4	62.1
Crop maturity	72.6	51.3
Moisture	71.4	64.3
Lack of foreign material	62.5	82.4
Odor	62.0	69.5
Texture	55.3	47.6
Color	34.0	43.5
Willing to pay more for quality-tested hay?		
Yes	87.0	43.0

Appendix C - Transportation Regulation Contact Numbers



Minnesota

1. Permit Agency

Minnesota Administrative Truck Centre
415 GNB Building
1110 Highway 110
Mendota Heights, MN 551188

Ph: (612) 405-60002.

2. Enforcement Agency

Department of Public Safety
State Patrol Division
State Transportation Bldg., Room 107
St.Paul, MN 55155

Ph: (612) 296-5949

Wisconsin

1. Permit Agency

Wisconsin Department of Transportation
Motor Carrier Permit Unit
Oversize/Overweight
P.O. Box 7980
Madison, Wisconsin 53707-7980

Ph: (608) 266-7320

2. Enforcement Agency

Department of Transportation
Division of State Patrol
P.O. Box 7912
Madison, WI 53707

Ph: (608) 266-3212

Indiana

1. Permit Agency

Department of Revenue
Motor Carrier Services
P.O. Box 6175
Indianapolis, IN 46206-6175

Ph: (317) 486-5500

2. Enforcement Agency

Indiana State Police
Motor Carrier Division
100 N. Senate Ave., Room #N340
Indianapolis, IN 46204-2259

Ph: (317) 233-6018

Illinois

1. Permit Agency

Department of Transportation
Permit Office
117 Administration Bldg.
2300 South Dirksen Parkway
Springfield, IL 62764

Ph: (217) 785-1477

2. Enforcement Agency

Illinois State Police
Commercial Vehicle Enforcement Bureau
201 E. Adams - Suite 250
Springfield, IL 62701

Ph: (217) 782-6267

Iowa

1. Permit Agency

Department of TransportationMotor
Carrier Services
Park Fair Mall
100 Euclid Ave.
Des Moines, Iowa 50306-0382

Ph: (515) 237-3264

2. Enforcement Agency

Department of Transportation
Motor Vehicle Enforcement
100 Euclid Avenue
Des Moines, IA 50313

Ph: (515) 237-3247

Kentucky

1. Permit Agency

Kentucky Transportation Cabinet
Department of Vehicle Regulation
Overweight/ Overdimension Section
Division of Motor Carriers
State Office Building
P.O Box 2007
Frankfort, KY 40602

Ph: (502) 564-7150

2. Enforcement Agency

Department of Vehicle Registration
Division of Motor Vehicle
Enforcement
State Office Building
Frankfort, KY 40622

Ph: (505) 564-3276