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Marketing and Pricing Alfalfa Hay

Clement E. Ward
Professor and Extension Economist

Marketing involves being customer oriented. It also means listening to buyers and understanding their wants and needs. Effective marketing of alfalfa begins before production and involves selecting target markets, planning production practices to produce alfalfa for each target market, and considering the timing of marketing efforts.

Marketing and pricing information in this extension fact sheet is drawn primarily from research at Oklahoma State University. Results of work over the past decade include an analysis of alfalfa hay transactions resulting from HAYMARKET (Ward 1989, 1994), a survey of alfalfa buyers in Oklahoma and Texas (Ward, Huhnke, and Cuperus 1995), and a least-cost transportation model of the U.S. alfalfa industry (Ward, Kariuki, and Huhnke 1998).

Importance of Quality

Quality of alfalfa is important for several reasons. Quality affects the target market for alfalfa produced and the price received for alfalfa marketed. Quality also affects production costs and practices. Producing higher quality alfalfa will reduce the total quantity of alfalfa produced and increase the cost of production.

The target market for alfalfa depends on the quality of hay produced. Dairy producers usually want alfalfa with a high feed value that can contribute to milk production. Dairy quality alfalfa typically means leafy alfalfa harvested in the bud stage with few weeds and grasses. Horse raisers want soft, green, leafy alfalfa for good horse nutrition. Plus, alfalfa hay must be free of blister beetles. Beef cattle and sheep producers may be more willing to use lower quality hay because ruminant animals need substantial fiber roughage for proper rumen activity.

Quality and Price Relationship

The quality of alfalfa produced affects the price buyers will pay for alfalfa. The price and quality relationship is important both for growers and buyers. Alfalfa growers must know the quality of their alfalfa before accurately estimating its value and realistically formulating an asking price. Dairy producers and other alfalfa buyers must know the quality of alfalfa in order to assess its value as a production input and to accurately develop a realistic bid price.

Objective measures of quality refer to those attributes for which there is some type of laboratory test. In contrast, subjective evaluation of alfalfa quality includes such things as visual appearance, feel, and smell. All are intended to estimate hay quality as a feed ingredient. For many years, the only available objective measure was crude protein (CP). Improved laboratory analyses enabled estimating fiber and total digestible nutrient (TDN) content of forages. Non-digestible nutrients are less valuable as a feed than digestible nutrients, so TDN is a relatively good measure of feed value for forages. Laboratory methods also estimate neutral detergent fiber (NDF), acid detergent fiber (ADF), and other attributes. NDF relates to the intake potential of the forage and measures fiber in the secondary plant cell wall. ADF measures the amount of total indigestible fiber and thus relates to digestibility. When NDF and ADF are combined in a series of formulae, they allow computing the relative feed value (RFV) of forages.

Dairy producers were asked to indicate the importance of five objective quality measures when purchasing alfalfa hay (Ward, Huhnke, and Cuperus 1995); i.e., crude protein (CP), total digestible nutrients (TDN), neutral detergent fiber (NDF), acid detergent fiber (ADF), and relative feed value (RFV). Dairy producers responding to the survey rated crude protein (CP) highest. The lowest acceptable protein content, on average, was 19.9% for high-producing cows and 16.2% for dry cows. For high-producing cows, there was a tendency for minimum acceptable protein to increase as buyer size increased. Survey results suggest what minimum alfalfa quality hay growers may use as a target level.

The second most important quality measure was total digestible nutrients (TDN). On average, the lowest acceptable level of TDN was 64% for high-producing cows and 57% for dry cows.

Alfalfa growers indicate that buyers often want to know the relative feed value (RFV) of alfalfa for sale. Yet, in this study, RFV was the third most important objective measure of alfalfa quality, behind CP and TDN. The lowest acceptable RFV content, on average, was 157 for high-producing cows and 135 for dry cows. The minimum level of RFV in Oklahoma increased along with buyer size for high-producing cows and decreased along with size of buyers for dry cows. Minimum acceptable RFV levels were higher for Texas buyers than for Oklahoma buyers for high-producing cows.

For the two components of RFV, growers indicated the lowest acceptable level of ADF for high-producing cows was 29.7%; and for dry cows, 32.3%. Higher values for ADF indicate more total fiber. For neutral detergent fiber (NDF), the lowest acceptable levels were 38.9% for high-producing cows and 45.5% for dry cows. Higher values for NDF indicate more indigestible fiber.

As a target for high-producing dairy cattle, alfalfa growers should produce alfalfa with the following objective attributes: CP=20%; TDN=65%; ADF=30%; NDF=40%; and RFV=150. Some growers use a 20-30-40 rule; 20% CP, 30% ADF, and 40% NDF. With that combination, the RFV will be near 150.

Research shows that buyers pay more for higher quality alfalfa (Ward 1989, 1994). However, data are typically not available to measure the price-quality relationship. Below are results of a study estimating how much HAYMARKET prices changed in 1992-93 with a one-unit increase in each quality measure. Alfalfa quality attributes are interrelated. However, the following relationships result from an independent estimate of the higher prices paid by buyers for higher quality alfalfa. Read the following as: a one-unit increase in Objective Measure was associated with a Resulting Value $/ton increase in sale price. Thus:

Objective Measure	Resulting Value
One unit increase in RFV	$0.32/ton increase in price
One % increase in TDN	$1.65/ton increase in price
One % increase in CP	$2.55/ton increase in price
One unit increase in NDF	$1.63/ton decrease in price
One unit increase in ADF	$1.64/ton decrease in price

The price premium for a one-percent increase in crude protein (CP) averaged $1.34/ton for five previous years (1983-84 to 1997-88) in which HAYMARKET data were available (Ward 1989). It ranged in individual years from a low of $0.33/ton to a high of $3.25/ton.

An indication that higher quality alfalfa is worth more to dairy producers can be shown by valuing alfalfa in dairy rations. Based on a series of equations (Richardson and Ward 1987) and assuming prices for corn at $2/bushel and soybean meal at $160/ton, dairy producers could pay $75/ton for alfalfa with 16% CP and 55% TDN, $89/ton for alfalfa with 20% CP and 60% TDN, and $102/ton for alfalfa with 24% CP and 65% TDN. While buyers can pay more for higher quality alfalfa, whether or not they will pay more depends primarily on current supply-demand conditions for alfalfa and alternative feedstuffs.

Weeds and Grasses

Dairy producers are also interested in knowing the amount of broadleaf weeds and grasses (referred to as weeds) in alfalfa. Buyers rated the amount of weeds among the most important types of information about the alfalfa they purchase (Ward, Huhnke, Cuperus 1995). The amount of weeds also significantly affected alfalfa prices in 1992-93, as in previous research (Ward 1989, 1994). Alfalfa hay with less than 5% weeds was chosen as the basis for comparison. Buyers significantly discounted alfalfa hay with larger amounts of weeds. Alfalfa sold with larger amounts of weeds was discounted in price $8.17-$25.11/ton. Thus, buyers are looking for alfalfa hay that is nearly weed free. Growers have a price incentive to keep their alfalfa free of weeds. In addition, they have a cost incentive related to controlling weeds and thereby prolonging stand life (for production economics information, see a companion Extension Facts WF-568, Economics of Producing Alfalfa). Over a previous five-year period (1983-84 to 1987-88), buyers discounted prices for alfalfa hay with larger amounts of weeds by $9.25/ton compared with alfalfa having less than 2% weeds.

Bale Type and Size

The harvesting package affects the cost of transporting and handling alfalfa. Thus, the bale type and size helps alfalfa growers identify their target market. Many dairy producers want alfalfa in large square or small rectangular bales but not round bales. Horse producers prefer small rectangular bales and not large square bales or round bales. Beef cattle and sheep producers prefer round bales or small rectangular bales.

The type and size of bale was found to affect alfalfa prices from HAYMARKET (Ward 1989, 1994). Small rectangular bales were used as the basis for comparison. Large square bales were discounted in price $7.51-$10.17/ton compared with alfalfa hay sold in small rectangular bales in 1992-93. Round bales were price discounted $16.43-$26.83/ton compared with small rectangular bales. The discount for round bales was not surprising, but the discount for large square bales was unexpected. Ward (1989) found for previous HAYMARKET data (1983-84 to 1987-88) that buyers paid price premiums for large square bales relative to small rectangular bales in three of the five years. Buyers also discounted alfalfa harvested in round bales by $10.88/ton on average over the same five-year period compared with small rectangular bales.

Some growers harvest alfalfa in round bales when they perceive that alfalfa quality does not merit using more expensive bale types (such as large square bales). If buyers are aware of that practice, it becomes more difficult for the growers of high quality alfalfa harvested in round bales to market their alfalfa at prices commensurate with its quality.

Seasonal Prices

Timing of alfalfa sales also affects growers' marketing plans. Alfalfa, like most agricultural commodities, exhibits a seasonal price pattern due to seasonal supplies, seasonal demands, or a combination of both. Seasonal price index values indicate how the price for a specific month differs from the annual average price over a specified period of years (often ten years).

For the 1988 to 1997 period, alfalfa prices on average in Oklahoma have been lowest at the beginning of the production-marketing year (May). Prices increase steadily on average through the production season and on through the fall and early winter months. Prices peak in January, remain high through February and March, then drop sharply until the new alfalfa harvest begins. Prices below the annual average price occur during the primary alfalfa harvesting months and when pasture forage is most readily available (May through September). Prices in April also fall below the annual average price in anticipation of the new crop year.

Price indexes provide some insight into longer-term alfalfa hay price patterns. However, any single year's price pattern may deviate from the seasonal average and the typical pattern. Still, it is useful to know what the normal seasonal price pattern is when making marketing decisions.

Storage and Out-of-Field Marketing

A high price is not the sole goal in marketing, though price is certainly important. Accepting a lower price for alfalfa hay sold from the field during the lower-price months may net higher returns than handling and storing alfalfa while waiting for a higher price during the higher-price months. Stored hay shrinks (loses moisture) as it cures. Therefore, about 10% fewer pounds of the same hay will be sold from storage as will be sold from the field at harvest. One ton from the field at $90/ton is equivalent to about $100/ton for the same hay after a 10% shrink. In addition, storing hay requires storage facilities, handling, and having your money tied up in inventory (unsold hay) for the storage period. However, if the annual average price is $100/ton, the average price in June (based on the latest 10-year price indexes) would be about $95/ton compared with $106/ton in January, a difference of $11/ton. In some years, the within-year price range from lowest price to highest price is considerably more than the $11/ton in this example, although it can also be considerably less. Therefore, in some years, storing alfalfa for a higher price is worth the added cost; but in other years, it is not. One strategy alfalfa growers might consider is marketing lower quality alfalfa hay from the field and storing higher quality alfalfa to market later in the marketing year.

Markets for Oklahoma Alfalfa

Animal scientists were asked to estimate daily consumption of alfalfa hay for each species during the winter and summer months (Ward, Kariuki, and Huhnke 1998). Estimated average daily alfalfa hay consumption (lbs. per head per day) over a twelve-month period by species was as follows: dairy cattle, 12.3; beef cattle, 3.6; feedlot cattle, 1.6; horses, 6.2; and sheep, 1.6. These amounts were used along with total livestock numbers to estimate alfalfa consumption by state. Texas was the largest alfalfa-consuming state. Others consistently among the ten leading states were California, Wisconsin, Nebraska, Kansas, Minnesota, Iowa, Missouri, and New York.

The difference between alfalfa production and estimated consumption in each state was used as an indicator of alfalfa surplus or deficit in each respective state. Major deficit states were most consistently in the southern region. Texas was by far the largest deficit state. Alfalfa surplus states tended to be in the northern and western states.

The least-cost movement of alfalfa from production to consumption regions was estimated for 1995 on a set of assumed transportation costs. Truck size and transportation rates vary from state to state, so a survey of agronomists assisted in identifying common load sizes and transportation rates for alfalfa hay. The average truckload size chosen was 44,000 lbs. Transportation rates chosen were $1.00/mile for higher quality alfalfa and $1.65/mile for lower quality alfalfa. The higher rate for lower quality alfalfa assumed lower quality alfalfa was harvested in less efficient bale sizes for long-distance transportation. Higher quality (dairy use) alfalfa was defined as alfalfa with a crude protein (CP) of 20% or more or a relative feed value (RFV) of 150 or more. Other alfalfa was referred to as lower quality alfalfa and was assumed to be fed to non-dairy livestock.

Results indicated that all higher quality alfalfa produced in Oklahoma should be shipped to Texas, and most lower quality alfalfa should be fed in Oklahoma. The model also was used to assess market potential for alfalfa produced in Oklahoma. Alfalfa production in Oklahoma was assumed to increase 20% above the 1995 production level, assuming a constant proportion of higher and lower quality alfalfa and no change in demand. With the assumed 20% increase in Oklahoma's alfalfa production, total exports from Oklahoma to other states increase, but the composition of exports changes. Oklahoma would ship significantly more alfalfa to Texas, both for dairy and non-dairy demand. While the study suggests increases in Oklahoma alfalfa production would likely increase alfalfa exports to Texas, not all would be at dairy-quality alfalfa prices.

Most alfalfa growers in Oklahoma consider Texas and Oklahoma their primary markets for Oklahoma-produced alfalfa. However, opportunities exist under certain market conditions or under special conditions to market alfalfa profitably to other states, such as Florida, Tennessee, Ohio, Missouri, and elsewhere.

Summary and Conclusions

Marketing planning is interrelated with production planning. Marketing means understanding buyers' needs and producing to meet those needs. Buyers typically pay premium prices for the alfalfa attributes they value: high feed value, few weeds and grasses, and their preferred harvesting package. Objectively measuring alfalfa quality (feed value) is important and will likely return more to alfalfa growers than the cost of the laboratory tests. Oklahoma growers have considered Texas and Oklahoma to be their primary markets for alfalfa for many years. Research shows that even with expanded production in Oklahoma, both Texas and Oklahoma will likely still remain the primary alfalfa markets for Oklahoma alfalfa growers.

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